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REPORT OF THE PROCEEDINGS

OF THE

FORTY-SECOND ANNUAL CONVENTION

OF THE

MASTER CAR BUILDERS' ASSOCIATION

HELD AT

ATLANTIC CITY, N. J.,

JUNE 17, 18 AND 19,

1908

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J. W. FOGG, M. M., Chicago Ter. Trans. Ry., E. Chicago, Ind.
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10.—Classes of Cars:

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W. C. ARP, S. M. P., Vandalia R. R., Terre Haute, Ind.

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LIST OF MEMBERS.

The names of Active members are printed in Roman type, Representative members in Italics, Associate and Life members in Small Capitals.

Date.	NAME.	No. of Cars Owned.	RAILROAD COMPANY AND ADDRESS.
1906	*Acker, C. L*	100	*M. M., Toledo Terminal, Toledo, Ohio.*
1900	*Adams, T. E*	10,424	*G. M. M., St. Louis Southwestern, Pine Bluff, Ark.*
1896	Adams, T. W	....	G. F., Maine Central, Waterville, Me.
1903	Addis, J. W	....	S. M. P., Texas & Pacific Ry., Marshall, Tex.
1892	Aldcorn, Thos	....	Chicago Pneumatic Tool Co., 95 Liberty street, New York.
1905	*Allen, Arthur*	610	*M. M., Temiskaming & Northern Ontario, North Bay, Ont., Can.*
1905	Allen, C. F.	....	F. C. R., Southern Ry., Selma, Ala.
1900	Allen, E. O	....	F. C. D., K. C. Southern, Shreveport, La.
1906	Alter, Wm	....	G. F., Central R. R. of N. J., Elizabethport, N. J.
1899	Anderson, Geo. T	....	Supt., C. N. Y. & B. Refr. Co., Elsdon, Ill.
1906	Appler, A. B	....	M. E., Delaware & Hudson, Green Island, N. Y.
1896	*Arp, W. C*	8,126	*S. M. P., Vandalia R. R., Terre Haute, Ind.*
1896	Atterbury, W. W.	....	G. M., Penna. R. R., Philadelphia, Pa.
1887	Augustus, Willis	....	M. M., Chicago, Bur. & Quincy, Centerville, Iowa.
1907	*Bachelor, F. L*	....	*Car Acct., Ft. Worth Belt, Ft. Worth, Tex.*
1897	Ball, H. F	....	V. P., Amer. Loco. Co., New York City.
1883	Barber, J. C.	....	Old Colony Building, Chicago, Ill.
1899	Barnum, M. K	....	Chicago, Burlington & Quincy, Chicago, Ill.
1907	Barrett, R. W.	....	M. C. B., Norfolk & So., Berkley, Va.
1892	Bartlett, H	....	G. S. M. P., Boston & Maine, Boston, Mass.
1899	Beauclerk, T. S.	....	Buenos Aires, Rosario & Central Argentine Ry., Rosario de Santa Fe, Arg. Rep., S. A.
1904	Beaumont, H. A.	....	Gen. Foreman Shops, Baltimore & Ohio, Baltimore, Md.
1895	Benson, E. A.	....	Mech. Supt., Pullman Co., Chicago, Ill.
1896	Bentley, W. F.	....	M. C. B., Baltimore & Ohio, Baltimore, Md.
1907	*Berry, L. W.*	949	*Supt., Lehigh & Hudson River, Warwick, N. Y.*
1900	Best, W. N	....	11 Broadway, New York, N. Y.
1903	*Billingham, R. A*	3,775	*G. M. M., Pittsburg, Shawmut & Northern, St. Mary's, Pa.*
1906	*Bishop, G. C*	2,622	*S. M. P., Long Island, Richmond Hill, L. I.*
1880	Blackwell, K. W	....	Prest., Montreal Steel Works, Montreal, Can.
1907	*Blackwell, R. F*	175	*Gen. Mgr., Idaho & Washington Northern R. R., Coeur d'Alene, Wash.*
1901	Blewett, S. H	....	American Car & Foundry Co., St. Louis, Mo.
1902	*Bloxham, C. M*	10,650	*M. C. B., Union Tank Line, 26 Broadway, New York.*
1900	*Bloxsam, D. E.*	3,888	*M. C. B., Houston & Texas Central, Houston, Tex.*
1890	Bossinger, H. C.	....	G. F., Chesapeake & Ohio, Huntington, W. Va.
1896	Bossinger, J. J.	....	G. F. C. R., Seaboard Air Line, Portsmouth, Va.
1907	Bottomly, E. S	....	Chief Joint Car Inspector, Martinsburg, W. Va.
1900	Boutet, H	....	Chief Joint Car Inspector, Carew Bldg., Cincinnati, Ohio.
1904	Bowen, H. A	....	6617 Washington avenue, Chicago, Ill.
1900	Bowers, C. H.	....	Gen. Supt., Georgia Car Co., Atlanta, Ga.

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Date.	NAME.	No. of Cars Owned.	Railroad Company and Address.
1901	Bradley, Jno. E		Osgood-Bradley & Sons, Worcester, Mass.
1906	Bradeen, J. O		M. M., N. Y. Central & Hudson River, New Durham, N. J.
1904	Brady, T. F.		Supt. Machinery, Mapimi R. R., Mapimi, Durango, Mex.
1904	Brassill, J. K		M. M., California-Northwestern, Tiburon, Cal.
1893	*Brazier, F. W*	81,108	*S. R. S., N. Y. C. & H. R., New York City.*
1889	*Bronner, E. D*	23,724	*S. M. P., Michigan Central, Detroit, Mich.*
1897	Brooke, Geo. D.		Isthmian Canal Commission, Canal Zone.
1907	*Brown, J. K.*	505	*M. C. B., Copper Range, Houghton, Mich.*
1905	Brown, Jos. W		Car Foreman, Coal & Coke Ry., Charleston, W. Va.
1904	*Brown, T. A*	926	*M. M., Louisiana & Arkansas, Stamps, Ark.*
1891	*Bruck, H. T.*	498	*S. M. P., Cumberland & Pennsylvania, Mt. Savage, Md.*
1882	*Bryan, H. S.*	5,623	*S. M. P., Duluth & Iron Range, Two Harbors, Minn.*
1908	*Bucholz, W. P*	1,400	*M. C. B., Cold Blast Trans. Co., Chicago.*
1900	Buker, James		Gen. Supt., Ostermann Mfg. Co., West Pullman, Ill.
1892	*Buker, Joseph*	67,307	*Asst. Supt. Mach'y, Illinois Central, Chicago, Ill.*
1908	Burcher, C. M		1953 Laurel street, Shreveport, La.
1906	Burel, W. C		M. M., Mexican Central, Saltillo, Coah., Mex.
1905	Burgis, E. W		M. M., N. O., Ft. Jackson & Grand Isle, Algiers, La.
1904	Burnett, R. W.		A. M. C. B., Canadian Pac., Montreal, Can.
1908	Burton, T. L		Gen. Inspector, C. R. R. of N. J., Jersey City, N. J.
1883	Bush, S. P		G. M., Buckeye Steel Castings Co., Columbus, Ohio.
1908	Bushmeyer, C. J		M. M., Oklahoma Central, Purcell, Okla.
1904	*Bussing, G. H*	5,713	*S. M. P., Evansville & Terre Haute, Evansville, Ind.*
1896	Butcher, G. W.		S. M. P. & M., San Antonio & Aransas Pass, San Antonio, Tex.
1908	Byrne, J. I.		C. D., Mexican International, C. P. D., Coah, Mex.
1886	Cade, J. R		M. C. B., Gal., Houston & San Antonio Ry., Houston, Tex.
1908	*Cahill, W. W*	54	*Supt., Tonopah & Tidewater, Los Angeles, Cal.*
1894	Cameron, J. E.		Mgr. So. Atlantic Car & Mfg. Co., Waycross, Ga.
1905	*Campbell, Mart*	1,343	*M. C. B., Mexican Ry., Orizaba, V. C., Mex.*
1893	Canda, F. E.		Canda Mfg. Co., 11 Pine street, New York.
1883	Carlton, Howard.		M. E., So. Baltimore Steel Car & Fdy. Co., Baltimore, Md.
1908	Carmer, J. R		G. F., Phila., Balt. & Wash., Wilmington, Del.
1904	Carney, J. A.		S. S., Chicago, Bur. & Quincy, W. Burlington, Iowa.
1889	Carr, W. K		G. F., Norfolk & Western, Roanoke, Va.
1902	Carson, G. E		M. C. B., Pitts. & Lake Erie, McKees Rocks, Pa.
1895	Carson, H. M.		A. to G. M., Pennsylvania, Philadelphia, Pa.
1894	Casanave, F. D		1710 Market street, Philadelphia, Pa.
1896	Case, S. T.		M. C. B., N. Y. C. & H. R., New York City.
1887	Casey, J. J.		Supt., Amer. Car & Fdy. Co., Jeffersonville, Ind.
1905	Chaffee, Edw. F		520 Ocean street, Brooklyn, N. Y.
1903	Chaffee, F. W		G. C. I., N. Y. Central & Hudson River, Albany, N. Y.
1907	Chamberlain, Eugene		Chairman Freight Car Repair Pool, N. Y. C. Lines, New York City.
1901	Chambers, Jno. S		S. M. P., Atlantic Coast Line, Rocky Mount., N. C.
1889	Charpiot, S. A.		Point Loma, San Diego, Cal.
1907	Christopher, J		M M. & M. C. B., Tor., Ham. & Buffalo, Hamilton, Ont., Can.
1908	*Chrysler, W. P.*	10,579	*S. M. P., Chgo. Gt. West., Oelwein, Iowa.*

LIST OF MEMBERS—*Continued.*

Date.	NAME.	No. of Cars Owned.	RAILROAD COMPANY AND ADDRESS.
1901	Clark, F. H		G. S. M. P., Chicago, Burlington & Quincy, Chicago, Ill.
1903	*Clark, J. H.*	86	*M. M., Staten Island R. T. Ry., Clifton, Staten Island, N. Y.*
1895	*Cleaver, F. C*	2,700	*S. M. P., Rutland, Rutland, Vt.*
1895	Close, Henry		27 N. 36th street, Philadelphia, Pa.
1900	*Coleman, Jas.*	37,571	*S. C. D., Grand Trunk Ry., Montreal, Can.*
1907	*Colgate, Thos*	1,200	*Litchfield & Madison Ry., Edwardsville, Ill.*
1890	*Coller, Chas*	5,885	*M. C. B., Chicago, Indianapolis & Louisville, La Fayette, Ind.*
1906	*Collins, J. N*	754	*M. C. B., Birmingham Sou., Pratt City, Ala.*
1907	Combs, S. W		M. C. B., Cuba R. R., Camaguey, Cuba.
1908	*Connelly, M. J*	299	*M. M., Ga., Fla. & Ala., Bainbridge, Ga.*
1899	*Connolly, J. J*	3,806	*S. M. P., Dul., So. Shore & Atlantic, Marquette, Mich.*
1904	*Conrades, E. H*	856	*Prest., St. L., Troy & Eastern, St. Louis, Mo.*
1907	*Converse, C. P*	187	*Copper River & Northwestern Ry., Seattle, Wash.*
1887	*Cook, John S*	1,859	*M. M., Georgia & G. J. & S., Augusta, Ga.*
1906	Cook, T. R.		A. E. M. P., Penna. Lines, Ft. Wayne, Ind.
1906	*Cooledge, C. A*	100	*Supt., Oregon Elec. Ry., Portland, Ore.*
1906	*Cooper, F. R*	7,951	*S. M., Kansas City Southern, Pittsburg, Kan.*
1907	Corinth, A. B		A. S. M. P., Atlantic Coast Line, Wilmington, N. C.
1907	*Cosgrove, P. H.*	1,777	*G. F. C. D., Colorado Midland, Colorado City, Colo.*
1902	Cota, A. J		M. M., Chicago, Burlington & Quincy, Chicago, Ill.
1891	Coulter, H		G. C. I., Phila., Balto. & Wash. Ry., Wilmington, Del.
1897	Courson, J. F.		G. F., Pennsylvania, Pitcairn, Pa.
1908	*Courtney, E. G.*	109	*M. M., Ark., La. & Gulf, Monroe, La.*
1904	*Coutant, M. R*	246	*M. M., Ulster & Delaware, Rondout, N. Y.*
1904	Cowen, J. H., Jr		F. C. D., D. & H. Co., B. & M. R. R., Mechanicville, N. Y.
1907	Craig, Andrew.		G. F., Boston & Maine, Lawrence, Mass.
1908	Craig, Jas.		C. D., Boston & Maine, Boston, Mass.
1900	Crawford, D. F		G. S. M. P., Penna. Lines, Pittsburg, Pa.
1904	Cromwell, O. C.		M. E., Baltimore & Ohio, Baltimore, Md.
1903	Cromwell, S. A		G. F. C. D., Baltimore & Ohio, Zanesville, Ohio.
1891	Crone, S. A		30 Pine street, New York City.
1908	*Cronkrite, E. L.*	226	*G. F. M. D., Astoria & Columbia River, Astoria, Ore.*
1906	*Crowe, C. C*	78	*Supt., Interstate R. R., Stonega, Va.*
1905	*Cullinan, Jno*	277	*M. M., Central Indiana, Muncie, Ind.*
1908	Cummings, J. J.		Prest., McGuire, Cummings Mfg. Co., Chicago, Ill.
1901	Cunningham, D. W.		A. S. M., Mo. Pac., Baring Cross, Ark.
1903	Curry, Nathaniel		Prest., Rhodes, Curry & Co., Amherst, N. S., Can.
1903	*Curtis, Theo. H*	40,584	*S. M., Louisville & Nashville Ry., Louisville, Ky.*
1889	Davenport, C. W		National Foundry Co., Erie, Pa.
1900	*Davis, Chas. H*	15	*State Line & Sullivan, Barclay, 25 Broad street, New York.*
1905	Davis, E. E		Newmarket, N. H.
1908	Davis, Geo. G		G. F. C. D., C. C. C. & St. L. Ry., Indianapolis, Ind.
1907	Davis, W. J		G. F., B. & O. R. R., Foxburg, Pa.
1905	*Davis, H. J*	85	*Supt., St. Clair Tunnel, Pittsburgh, Pa.*
1900	*Davisson, F. E*	3,302	*S. M., San Pedro, Los Angeles & Salt Lake, Los Angeles, Cal.*
1897	Dawson, E.		Osceola, Iowa.
1896	Deacon, Edw.		Supt., Consolidated Rolling Stock Co., Bridgeport, Conn.
1907	*Deckleman, G. F*	189	*M. M., Nevada Northern, Ely, Nev.*
1901	Deems, J. F.		G. S. M. P., N. Y. Central Lines, New York City.

LIST OF MEMBERS—*Continued.*

Date.	NAME.	No. of Cars Owned.	RAILROAD COMPANY AND ADDRESS.
1905	Deibert, J. H.		F. C. R., Lehigh Valley, Buffalo, N. Y.
1900	Demarest, H. N.		G. C. I., Penna. R. R., Williamsport, Pa.
1900	*Demarest, T. W.*	53,548	*S. M. P., Penna. Lines, Ft. Wayne, Ind.*
1902	*De Silva, E*	546	*M. M., Santa Fe, Prescott & Phœnix, Prescott, Ariz.*
1901	Deverell, A. C		Supt. Shops, Great Northern, St. Paul, Minn.
1908	De Vilbiss, G. J.		S. M. P., Hocking Valley, Columbus, Ohio.
1907	DeVoy, J. F		M. E., C. M. & St. P. Ry., West Milwaukee, Wis.
1906	*Diaz, M. L.*	280	*C. E., Havana Central, Havana, Cuba.*
1888	Dickerman, C. H		Milton Car Works, Milton, Pa.
1906	Dickerson, S. K.		A. S. M. P., Lake Shore & Michigan Southern, Cleveland, Ohio.
1907	Dickinson, E. W		M. C. B., Bessemer & Lake Erie, Greenville, Pa.
1908	*Dickson, John*	48	*M. M., Spokane, Portland & Seattle, Vancouver, Wash.*
1900	Dillon, S. J.		M. M., Penna., Riverton, N. J.
1881	Divine, Jno. F.		Asst. Gen'l Supt., Atlantic Coast Line, Wilmington, N. C.
1901	*Dixon, Geo. W.*	50	*M. M., Pittsburg, Lisbon & Western, Lisbon, Ohio.*
1908	Dodds, E. I		Asst. S. C. D., Erie R. R., Meadville, Pa.
1906	*Dodge, R. N.*	346	*Car Foreman, Ill., Iowa & Minn., Rockford, Ill.*
1905	*Dolan, J. P*	350	*M. M., Mo. & No. Arkansas, Eureka Springs, Ark.*
1906	Dolan, S. M.		
1908	*Doolittle, R. L*	4,158	*M. M., Atlanta, Birmingham & Atl., Fitzgerald, Ga.*
1892	Dow, Geo. N		G. M. I., Lake Shore & Mich. Southern, Cleveland, Ohio.
1905	Downing, I. S		M. C. B., Lake Shore & Mich. Southern, Collinwood, Ohio.
1904	Downing, T. M		M. M., Virginia & Carolina Coast, Suffolk, Va.
1892	Doyle, John.		M. C. B., Mo., Kan. & Tex., Denison, Tex.
1908	*Dresser, K. L.*	588	*M. M., Chgo., Cin. & Louisville, Peru, Ind.*
1904	Drury, M. J		D. M. M., A. T. & S. F. Ry., La Junta, Colo.
1908	*Duff, W. R.*	2,133	*Trinity & Brazos Valley, Houston, Tex.*
1906	Dunbar, T		Mgr., Pullman Car Works, Pullman, Ill.
1906	Dunham, W. E.		M. M., Chicago & North-Western Ry., Winona, Minn.
1906	*Dunkle, S. K*	12	*S. M. P., Benwood & Wheeling Con., Benwood, W. Va.*
1900	*Dunn, A. J*	2,827	*M. M., Virginia & Southwestern Ry., Bristol, Tenn.*
1897	*Dunn, J. F*	8,420	*S. M. P. & M., Oregon Short Line, Salt Lake City, Utah.*
1894	*Durborow, R. N.*	109,533	*S. M. P., Penna. R. R., Altoona, Pa.*
1906	*Durham, H. P*	1,440	*S. M. P., Tehuantepec Natl., Rincon, Ant., Mex.*
1908	Dyas, E. C		F. C. D., Louisville & Nashville, Mobile, Ala.
1896	Eaton, F. H.		Vice-Prest., American Car & Foundry Co., New York.
1906	Eaton, G. H.		A. M. C. B., Can. Pacific, Winnipeg, Man., Can.
1905	Eberle, W. F.		G. F., Pennsylvania, Altoona, Pa.
1895	Eckart, Jno., Jr.		F. C. R., Erie, Bradford, Pa.
1894	Eddy, F. H		G. F. C. D., Boston & Maine, East Fitchburg, Mass.
1906	Edmondson, T. A.		G. M., Illinois Car Co., Urbana, Ohio.
1907	Egan, P. M.		G. F. C. D., Union Pacific Ry., Council Bluffs, Iowa.
1893	Elliott, J. M., Jr		Prest., Southern Car & Foundry Co., Gadsden, Ala.
1903	Elmer, Wm., Jr.		M. M., Pennsylvania, Pittsburgh, Pa.
1903	*Emerson, G. H*	46,269	*S. M. P., Great Northern Ry. Line, St. Paul, Minn.*
1906	*Englisch, O. B*	300	*V. P., Erie & Mich. Ry. & Nav. Co., Chicago, Ill.*
1884	Ennis, W. C.		Passaic, N. J.
1908	*Enright, J. F.*	4,039	*Supt. Mach'y, Int. & Gt. Nor. Ry., Palestine, Tex.*

LIST OF MEMBERS—*Continued.*

Date.	NAME.	No. of Cars Owned.	RAILROAD COMPANY AND ADDRESS.
1904	*Epstein, Max*	2,000	*G. M., German-Amer. Car Lines, Chicago, Ill.*
1904	Ettinger, R. L.		C. M. E., Southern, Washington, D. C.
1908	*Evans, R. C*	6,200	*S. M. P., West. Md. Ry., Hagerstown, Md.*
1905	Everett, Ira		G. F., Lehigh Valley, Packerton, Pa.
1900	Ewing, J. J		Mech. Engr., Ches. & Ohio, Richmond, Va.
1896	Fay, A. R.		G. A., Swift Live Stock Trans. Co., Chicago, Ill.
1905	*Feeley, T. M*	2,939	*M. M., Iowa Central, Marshalltown, Iowa.*
1905	*Ferguson, G. M*	437	*Supt., Lake Terminal, Lorain, Ohio.*
1907	*Field, A. G.*	303	*Auditor, Parral & Durango, Parral, Mex.*
1893	Fildes, Thos.		Gold Car Heating Co., New York, N. Y.
1907	Finlayson, Chas		G. C. F., Union Pac. Ry., Cheyenne, Wyo.
1897	*Fisher, E*	135	*G. S., Toronto, Hamilton & Buff., Hamilton, Ont., Can.*
1905	Fite, J. T		G. C. F., El Paso & Southwestern System, El Paso, Tex.
1906	Fitzgerald, W. T.		M. M., Wisconsin & Michigan, Peshtigo, Wis.
1901	Fitzmorris, Jas		M. M., Chicago Jct., Chicago, Ill.
1898	Fleming, J. W		G. F. C. D., Ches. & Ohio, Richmond, Va.
1904	Flory, B. P		M. E., Central R. R. of N. J., Jersey City, N. J.
1902	*Fogg, J. W.*	798	*M. M., Chicago Terminal Transfer, East Chicago, Ind.*
1901	*Foque, T. A.*	13,383	*M. S., M. St. P. & Sault Ste. Marie, Minneapolis, Minn.*
1882	Forsyth, Wm.		The Railroad Age-Gazette, Chicago, Ill.
1904	Foster, W. T		M. M., Tennessee Copper Co.'s Ry., Copperhill, Tenn.
1896	*Fowler, W. E.*	51,641	*M. C. B., Canadian Pacific, Montreal, Can.*
1895	Fox, Frank L.		F. C. R., Pere Marquette, Ionia, Mich.
1906	French, G. W		M. M., Little Rock & Hot Springs Western, Hot Springs, Ark.
1908	*Freshman, S. D.*	59	*A. G. M., Sierra Ry. of Cal., Jamestown, Cal.*
1904	Fries, A. J		M. M., Boston & Albany, Springfield, Mass.
1897	Friese, N. L.		G. F. C. D., Norfolk & Western, Roanoke, Va.
1903	Fuller, C. E	17,902	S. M. P., Union Pacific, Omaha, Neb.
1890	*Gage, C. M*	2,769	*G. M., Hunt. & Broadtop, Huntington, Pa.*
1900	*Gaines, F. F*	10,582	*S. M. P., Cent. of Ga. Ry., Savannah, Ga.*
1906	*Gallagher, G. A*	6,234	*M. M., Southern Indiana, Bedford, Ind.*
1907	*Gano, J. H.*	23	*Supt., Aliquippa & Southern R. R., Woodlawn, Pa.*
1902	Garland, W. L.		Gen'l Agt., Safety Car Heating & Lighting Co., Philadelphia, Pa.
1890	Garrett, M. A		1713 Fisher Building, Chicago, Ill.
1888	*Garstang, W.*	28,592	*S. M. P., C. C. C. & St. L., Indianapolis, Ind.*
1908	Gaskill, C. S		A. E. M. P., Phila., Balt. & Wash. Ry., Wilmington, Del.
1904	Gauthier, J		M. M., Copper Range, Houghton, Mich.
1906	Geesey, R. W		Insp., Pennsylvania, Altoona, Pa.
1891	Gibbs, A. W.		G. S. M. P., Pennsylvania, Altoona, Pa.
1890	Gibbs, Geo.		Rapid Tr. Sub. Const. Co., 10 Bridge st., New York City.
1903	Gilbert, E. A.		W. H. Miner Co., Chicago, Ill.
1894	*Gilbert, E. B.*	9,596	*S. M. P., Bessemer & Lake Erie, Greenville, Pa.*
1904	Gilbert, F. M		M. E., N. Y. Central & Hudson River, New York City.
1905	Gilman, G. H.		M. C. B., Northern Pacific, St. Paul, Minn.
1905	Girten, W. F		Gen. Storekeeper, C. R. R. of N. J., Elizabethport, N. J.

LIST OF MEMBERS—*Continued.*

Date.	NAME.	No. of Cars Owned.	RAILROAD COMPANY AND ADDRESS.
1903	Glover, Geo. T.	....	Wks. Mgr., Northeastern Ry., New Shildon, County Durham, Eng.
1897	Goehrs, W. H	....	765 Kedzie ave., Chicago, Ill.
1908	Goodnow, T. H	....	M. C. B., L. S. & M. S. Ry., Chicago, Ill.
1907	*Goodrich, G. P*	1,441	*M. M., Ft. Smith & Western, Ft. Smith, Ark.*
1900	*Goodrich, Max.*	129	*M. M., New York & Ottawa, Santa Clara, N. Y.*
1907	Gordon, R. L.	....	Asst. to Prest., Standard Steel Car Co., New York City.
1897	Gorrell, W. T.	....	M. C. B., Philadelphia & Reading, Reading, Pa.
1907	*Gould, J. E*	2,447	*S. M. P., Norfolk & Southern, Berkley, Va.*
1898	Gould, R	....	Care of Buenos Ayres Great Southern, River Plate House, Finsbury Circus, London, Eng.
1895	*Graham, J. F.*	4,093	*M. M., Oregon Ry. & Nav. Co., Portland, Ore.*
1901	*Grattan, D*	921	*M. M., Butte, Anaconda & Pacific, Anaconda, Mont.*
1908	*Gray, B. H.*	1,098	*S. M. P., Mobile, Jackson & Kansas City, Mobile, Ala.*
1906	Gray, G. M	....	M. E., Bessemer & Lake Erie, Greenville, Pa.
1889	Greatsinger, J. L.	....	168 Montague street, Brooklyn, N. Y.
1904	Greaven, Louis	....	S. M. P., Buenos Ayres Great Southern, Buenos Ayres, Arg. Rep., S. A.
1904	Green, Herbert	....	M. E., So. Balto. Steel Car & Fdy. Co., Baltimore, Md.
1898	Greene, M. D.	....	Sec'y, National Car Co., St. Albans, Vt.
1885	Grieves, E. W	....	Mech. Expert, Galena-Signal Oil Co., 1756 Park ave., Baltimore, Md.
1901	*Griffiths, H. H*	96	*Supt., Western Pac. Ry., Stockton, Cal.*
1906	*Grimshaw, S. B*	94	*Asst. to Prest., Santa Fe Central, Santa Fe, N. M.*
1892	Gunn, R.	....	M. C. B., Erie, Buffalo, N. Y.
1903	Hacking, Edw.	....	G. C. F., Chicago Great Western, Oelwein, Iowa.
1903	*Hair, John.*	9,778	*S. M. P., Balto. & Ohio Southwestern, Cincinnati, Ohio.*
1907	*Hale, W*	171	*G. S., Durham & Southern, Durham, N. C.*
1908	*Hall, H. H*	1,672	*M. M., Gulf & Ship Island R. R., Gulfport, Miss.*
1904	*Hall, Wm. B*	2,600	*Mather Stock Car Co., Chicago, Ill.*
1907	Hall, W. H.	....	C. C. I., Cent. R. R. of N. J., Jersey City, N. J.
1907	*Hamilton, Tabor*	674	*Cumberland Valley R. R., Chambersburg, Pa.*
1903	Hamilton, Wm	....	Prest., Erie Car Works, Erie, Pa.
1902	*Hammett, P. M*	7,902	*S. M. P., Maine Central, Portland, Me.*
1900	*Hancock, G. A*	34,099	*S. M. P., St. Louis & San Francisco, Springfield, Mo.*
1894	Hannaford, P. W	....	G. F. C. D., Maine Central, Waterville, Me.
1894	Harris, Wells.	....	G. F. C. R., N. Y., New Haven & Hart., New Haven, Conn.
1907	*Hartley, C. H.*	53	*G. M., Wisconsin & Northern, Oshkosh, Wis.*
1893	Hassman, Wm	....	M. M., Peoria & Pekin Union Ry., Peoria, Ill.
1907	Hayes, A. C	....	G. C. F., N. Y. C. Lines, Springfield, Mass.
1893	*Hayward, H. S*	10,000	*S. M. P., West Jersey & Seashore, Jersey City, N. J.*
1902	Henderson, Geo. R.	....	20 W. 34th street, New York City.
1890	*Hennessey, J. J.*	51,000	*M. C. B., Chicago, Mil. & St. Paul, West Milwaukee, Wis.*
1907	*Henry, W. C. A.*	23,525	*S. M. P., Penna. Lines West, Columbus, Ohio.*
1897	Herr, E. M.	....	V. P., Westinghouse A. B. Co., Wilmerding, Pa.
1906	Hibbits, F. N.	....	S. M. P., Lehigh Valley, South Bethlehem, Pa.
1892	Higgins, Sam'l.	....	G. M., N. Y., N. H. & H. R. R., New Haven, Conn.
1908	Hill, John.	....	M. M., Lake Erie & Western, Tipton, Ind.
1903	Hill, Rufus,	....	M. M., Pennsylvania, Camden, N. J.

LIST OF MEMBERS—*Continued.*

Date.	NAME.	No. of Cars Owned.	RAILROAD COMPANY AND ADDRESS.
1907	*Hills, H. S*	274	*M. M., Louisville & Atlantic, Richmond, Ky.*
1906	*Hinckley, A. C.*	12,838	*M. M., Cin., Hamilton & Dayton, Lima, Ohio.*
1908	*Hinckley, G. C.*	38	*Supt., Manufacturers' Junction Ry., Chicago.*
1906	Hindman, S. M		G. C. I., Pennsylvania, Altoona, Pa.
1901	Hodgson, John		M. C. B., Grand Trunk, Port Huron, Mich.
1906	Hogsett, J. W		Chief Joint Car Inspr., Ft. Worth, Tex.
1901	Holland, J. P.		Car Fore., Chicago & North-Western, Milwaukee, Wis.
1904	Homer, J. C.		A. M. M., Cin., Hamilton & Dayton, Indianapolis, Ind.
1906	Hopkins, G. H.		G. F., South Side Elevated, Chicago, Ill.
1898	*Horrigan, Jno*	12,527	*S. M. P., Elg., Jol. & East. and C. L. S. & E., Joliet, Ill.*
1899	Howard, C. H		Prest., Commonwealth Steel Co., St. Louis, Mo.
1904	Howard, Frank.		G. F., Wabash, Toledo, Ohio.
1904	Howard, John.		S. M. P., N. Y. C. & H. R. R. R., New York City.
1904	*Hubbell, Ira C*	2,074	*Buyer, K. C., Mexico & Orient, Chicago, Ill.*
1906	*Hube, H*	38	*Morrissey, Fernie & Michel, Fernie, B. C.*
1908	*Hudson, T. C.*	1,958	*M. M., Quebec & Lake St. John, Can. Northern Quebec, Quebec, Can.*
1900	Hughes, J. A.		M. C. B., Oahu R. R. & L. Co., Honolulu, Hawaii.
1891	Humphrey, A. L.		G. M., Westinghouse Air Brake Co., Wilmerding, Pa.
1906	Hyndman, F. T.		New Haven, Conn.
1902	*Irvin, Jos. E*	225	*M. M., Mar., Col. & Cleveland, Marietta, Ohio.*
1908	*Irvin, T. B.*	1,545	*M. M., Charleston & Western Carolina, Augusta, Ga.*
1906	James, E. T		M. M., N. Y. N. H. & H. R. R., New Haven, Conn.
1901	James, J. M		M. M., Pennsylvania, Olean, N. Y.
1907	Jewell, G. C.		F. C. R., Norfolk & Southern Ry., New Bern, N. C.
1902	*Johnson, Ben.*	11,200	*S. M. P., Mexican Central, Aguascalientes, Mex.*
1908	Johnson, Rankin		G. M., Bolivia Ry. Co., La Paz, Bolivia, S. A.
1895	Johnson, R. H.		No. 12 Ortega, Mexico, D. F.
1903	Johnson, W. O		M. M., Empire Shops, Canal Zone.
1908	*Jones, D. L.,*	1,484	*Quebec, Montreal & Southern, Sorel, Que., Can.*
1895	*Joughins, G. R.*	12,502	*Mech. Supt., Intercolonial, Moncton, N. B.*
1904	Julien, B.		G. C. F., Union Pacific, Omaha, Neb.
1902	Kaderly, W. F.		M. M., Southern Ry., Alexandria, Va.
1901	*Kalbaugh, I. N.*	2,152	*S. M. P., Coal & Coke Ry., Gassaway, W. Va.*
1903	*Kapp, W. F.*	507	*S. S. & M., Rich., Fred'sburg & Potomac Ry., Richmond, Va.*
1903	Keagy, C. O.		Gen. Foreman, Penna. R. R. W. Philadelphia, Pa.
1894	Kearney, Alex.		A. S. M. P., Norfolk & Western, Roanoke, Va.
1904	*Keegan, J. E.*	3,520	*S. M. P., Grand Rapids & Indiana, Grand Rapids, Mich.*
1903	*Kehrman, J. F.*	1,101	*M. M., Miss. River & Bonne Terre, Bonne Terre, Mo.*
1899	Keith, Eben S. S.		Keith Mfg. Co., Sagamore, Mass.
1900	Keithley, J. T.		G. F. H. C. Frick Coke Co., Everson, Pa.
1906	*Kellogg, W. L.*	19,730	*M. M., Pere Marquette, Detroit, Mich.*
1896	Kells, Willard		M. M., Lehigh Valley R. R., Buffalo, N. Y.

LIST OF MEMBERS—*Continued.*

Date.	NAME.	No. of Cars Owned.	Railroad Company and Address.
1907	Kelly, J. W.		Div. C. F., Canadian Pacific, Toronto Jct., Ont., Can.
1901	Kendall, A. L.		G. F. C. D., N. Y. Cent. & Hudson River, W. Albany, N. Y.
1905	Kendig, R. B.		M. E., Lake Shore & Mich. Southern, Cleveland, Ohio.
1908	*Kennedy, Wm.*	3,259	*S. M. P., Central Vermont, St. Albans, Vt.*
1896	Kenney, G. W.		Rutland, Rutland, Vt.
1899	Kent, F. S.		G. C. I., Pennsylvania, Jersey City, N. J.
1901	*Kent, W. W.*	317	*G. M., Chattanooga Southern, Chattanooga, Tenn.*
1901	Keyworth, Thos. E.		Cuban Central Rys., Limited, Sagua La Grande, Cuba.
1901	Kiesel, W. F., Jr.		A. E. M. P., Penna., Altoona, Pa.
1908	Kiler, J. R.		M. M., Can. Yaqui River & Pacific, Guaymas, Sonora, Mex.
1908	Kimbell, J. F.		El Paso & Southwestern System, Carrizozo, N. M.
1906	Kimmett, M. A.		G. F. C. D., Central R. R. of N. J., Ashley, Pa.
1900	King, Geo. I.		Middletown Car Works, Middletown, Pa.
1898	King, Samuel		Supt. Canada Car Co., Montreal, Can.
1903	*Kinnaird, L. S.*	2,884	*M. M., Cleve., Akron & Columbus Ry., Mt. Vernon, Ohio.*
1908	Kinter, D. H.		G. F. C. D., Monongahela R. R., Brownsville, Pa.
1892	Kirby, T. B		1,551 Railway Exchange Building, Chicago, Ill.
1902	*Kirk, Peter.*	120	*Chihuahua & Pacific, Chihuahua, Mex.*
1887	Kittredge, A. M.		Barney & Smith Mfg. Co., Dayton, Ohio.
1903	Kleine, R. L.		G. C. I., Pennsylvania, Altoona, Pa.
1907	Knapp, D. F.		G. C. F., So. Pac. Co., Portland, Ore.
1906	Knight, W. E.		S. M. P., Cuba R. R., Camaguey, Cuba.
1903	*Kucher, T. N.*	1,774	*M. M., Toledo, Peoria & Western Ry., Peoria, Ill.*
1907	*La Mar, A.*		*Asst. G. C. I., Penna. Lines, Ft. Wayne, Ind.*
1903	La Rue, H.		M. C. B., Chicago, Rock Island & Pac., Chicago, Ill.
1907	Latta, H. P.		M. M., Seaboard Air Line, Jacksonville, Fla.
1896	Lawes, T. A.		M. E., N. Y., Chicago & St. Louis, Cleveland, Ohio.
1903	*Leaman, Jno*	880	*G. C. F., Sydney & Louisburg Ry., Glace Bay, C. B., Can.*
1879	*Lentz, John S.*	44,708	*M. C. B., Lehigh Valley, So. Bethlehem, Pa.*
1908	*Levinson, H. M.*	673	*Supt., Sierra Madre & Pacific, El Paso, Tex.*
1905	Lewis, H. L.		F. C. S., Delaware & Hudson, Green Island, N. Y.
1889	*Lewis, W. H.*	38,623	*S. M. P., Norfolk & Western, Roanoke, Va.*
1908	*Libby, J. E.*	8,000	*M. C. B., Swift Refr. Trans. Co., Chicago, Ill.*
1907	Lillie, G. W.		S. C. D., St. Louis & San Francisco, St. Louis, Mo.
1896	Lindstrom, Chas.		Chief Engr., Pressed Steel Car Co., Allegheny, Pa.
1908	*Littell, C. N.*	1,355	*G. F., St. Louis Refr. Car Co., St. Louis, Mo.*
1903	*Lloyd, T. S.*	28,000	*S. M. P. & M., D. L. & W. R. R., Scranton, Pa.*
1906	*Lockhart, F. B.*	1,010	*United Coal Co., Pittsburg, Pa.*
1905	Lockwood, B. D.		M. E., C. C. C. & St. L., Indianapolis, Ind.
1894	Love, W. A.		Southern Iron & Equipment Co., Atlanta, Ga.
1903	Lovell, Alfred		819 Harrison Bldg., Philadelphia, Pa.
1901	Lowry, W. D.		3,624 Castleman Ave., St. Louis Mo.
1891	Lungren, W. H.		F. C. S., Phila., Balt. & Wash., Wilmington, Del.
1891	McAlpine, A. R.		F. W. Bird & Son, Monadnock Bldg., Chicago, Ill.
1908	*McCampbell, Wm*	1,018	*M. M., N. O. Great Northern, Florenville, (Audubon P. O.) La.*

LIST OF MEMBERS—*Continued.*

Date.	NAME.	No. of Cars Owned.	RAILROAD COMPANY AND ADDRESS.
1882	McCarthy, H. C.	....	Galena Signal-Oil Co., Williamsport, Pa.
1891	McConnell, J. H.	....	Pittsburg, Pa.
1895	*McCuen, J. P.*	17,233	*S. M. P. & M., Cin., N. O. & Tex Pac., Ludlow, Ky.*
1897	*McCuen, R. E.*	600	*M. M., Lexington & Eastern, Lexington, Ky.*
1903	*McCullogh, W. G.*	13	*Dry Fork R. R., Hendricks, W. Va.*
1897	*McCullough, C. B.*	66	*Mgr., Cammal & Black Forest, Jersey Shore, Pa.*
1906	*McDonald, H. M.*	462	*S. C. S., Washington Run R. R., Dawson, Pa.*
1903	McDonnell, P.	....	Car Foreman, Missouri Pacific, Pueblo, Colo.
1907	*McFarland, W. W.*	175	*G. M., Delaware River & Union, Philadelphia, Pa.*
1904	*McFeatters, F. R.*	4,000	*Supt., Union R. R., Port Perry, Pa.*
1908	McGee, W. J.	....	M. M., Tampa Northern, Tampa, Fla.
1907	McGill, A. M.	....	M. M., Lehigh Valley, Wilkesbarre, Pa.
1907	McIlvaine, C. L.	....	A. E. M. P., Pennsylvania, Buffalo, N. Y.
1899	*McIntosh, Wm.*	22,742	*S. M. P., Central R. R. of New Jersey, Jersey City, N. J.*
1902	*McKee, G. S.*	11,100	*S. M. P., Mobile & Ohio, Mobile, Ala.*
1904	*McKee, G. S.*	5,383	*N. O. & N. E., A. & V., V. S. & P. Rys., Mobile, Ala.*
1893	McKeen, W. R., Jr.	....	Consulting Engr. of Motor Cars, Union Pac., Omaha, Neb.
1895	McKenna, R. F.	....	M. C. B., Dela., Lack. & Western, Scranton, Pa.
1905	*McLeod, Thos. R.*	349	*M. M., Halifax & Southwestern, Bridgewater, N. S., Can.*
1894	McMasters, C. J.	....	M. M., O. & L., C. Div., Rutland, Malone, N. Y.
1894	McNaughton, Jas.	....	Amer. Loco. Co., Schenectady, N. Y.
1905	McNaughton, J. A.	....	G. M., Cudahy Refrigerator Line, South Omaha, Neb.
1906	*McNulty, F. M.*	650	*S. M. P., Monongahela Connecting, Pittsburg, Pa.*
1905	McRae, J. A.	....	M. E. Mich. Central, Detroit, Mich.
1908	MacEnulty, J. F.	....	Gen. Supt., Western Steel Car & Fdy. Co., Chicago, Ill.
1883	Mackenzie, John.	....	60 Hawthorne ave., Cleveland, Ohio.
1907	*Magill, J. P.*	47	*Traffic Mgr., Brimstone R. R. & Canal Co.,* 82 *Beaver street, New York City.*
1896	Maguire, P. J.	....	Care of A. E. Roone, Supt. Tel., So. Pac. Co., San Francisco, Cal.
1896	*Maher, P.*	14,576	*S. M. P., Chicago & Alton, Toledo, St. Louis & Western, Bloomington, Ill.*
1895	Mahl, F. W.	....	Gen. Pur. Agt., Colorado & Southern, Denver, Colo.
1907	*Maloney, J. P.*	54	*T. M., Albany & Hudson, Albany, N. Y.*
1906	Malthaner, W.	....	M. M., Delaware & Hudson, Green Island, N. Y.
1907	Manchester, A. E.	....	S. M. P., Chgo., Mil. & St. Paul, West Milwaukee, Wis.
1904	Mandeville, H.	....	G. F. C. D., Pennsylvania, Jersey City, N. J.
1895	*Manning, J. H.*	22,327	*S. M. P., Delaware & Hudson, Albany, N. Y.*
1901	Marchbanks, Jas.	....	Loco. Supt., Wellington & Manawata, Wellington, N. Z.
1903	Marden, J. E.	....	G. F. C. D., Boston & Maine, Portland, Me.
1877	*Marden, J. W.*	28,224	*S. C. D., Boston & Maine, Boston, Mass.*
1908	Marea, M.	....	M. M., Toledo, St. Louis & Western, Frankfort, Ind.
1899	Marshall, E. S.	....	Republic Ry., Appliance Co., St. Louis, Mo.
1899	Marshall, W. H.	....	Prest., Amer. Loco. Co., 30 Church street, New York City.
1908	Martin, J. C.	....	F. C. D., Louisville & Nashville, Howell, Ind.
1906	Martin, J. H.	....	S. C. S., Berwind-White Coal Co., Philadelphia, Pa.
1898	Mather, A. C.	....	Prest., Mather Stock Car Co., Chicago, Ill.
1906	Mayne, J. G.	....	A. L. S., Cuban Central, Sagua la Grande, Cuba.
1905	*Mead, E. W.*	201	*G. M. R. G., Sierra Madre & Pacific, El Paso, Tex.*
1895	Mendenhall, C. M.	....	2 Rector street, New York City.
1907	Mengel, J. C.	....	M. M., Pennsylvania, Philadelphia, Pa.
1902	*Menzel, W. G.*	8,100	*S. M. P., Wis. Cent., Fond du Lac, Wis.*

LIST OF MEMBERS—*Continued.*

Date.	NAME.	No. of Cars Owned.	RAILROAD COMPANY AND ADDRESS.
1906	Meredith, H. P.		A. E. M. P., Pennsylvania, Altoona, Pa.
1897	Mertsheimer, F.		G. S. M. P., Kansas City, Mexico & Orient, Kansas City, Mo.
1891	Michael, J. B.		M. M., Southern Railway, Knoxville, Tenn.
1891	Middagh, D. B.		G. F., Norfolk & Western, Roanoke, Va.
1908	*Middlebrooks, Z.*	25	*G. M., Florida Central, Thomasville, Ga.*
1892	*Mileham, C. M.*	1,800	*M. C. B., Doud Stock Car Co., Chicago, Ill.*
1907	Millar, E. T.		G. F. C. D., B. & M. R. R., Concord, N. H.
1886	Millen, Thos.		G. M. M., Met. St. Ry., 106 W. 51st st., New York City.
1908	*Miller, A. C.*	397	*G. F. M. D., Texas Midland, Terrell, Tex.*
1905	*Miller, E. A.*	12,304	*S. M. P., N. Y., Chicago & St. Louis, Cleveland, Ohio.*
1907	Miller, E. B.		C. I., B. & O. R. R., Wheeling, W. Va.
1895	*Miller, G. A.*	1,125	*S. M. P., Florida East Coast, St. Augustine, Fla.*
1900	Miller, R. S.		G. F. C. D., N. Y., Chicago & St. Louis, Cleveland, Ohio.
1904	Miller, S. F.		F. C. D., El Paso Southwestern System, Carrizozo, N. M.
1901	Miller, S. W.		Supt., American Loco. Co., Scranton, Pa.
1895	Miller, Wm		M. C. B., Erie, Dunmore, Pa.
1903	*Millican, S.*	500	*M. M., Houston, East & West Texas Ry., Houston, Tex.*
1896	*Milliken, J.*	10,000	*S. M. P., Phila., Balto. & Wash. Ry., Wilmington, Del.*
1906	*Millis, H. L.*	1,000	*G. M., Western Live Stock Exp. Co., Chicago, Ill.*
1904	*Mills, Wm.*	922	*M. C. B., Algoma Cent., Sault Ste. Marie, Ont., Can.*
1904	Milton, J. H.		G. F. C. D., Chicago & Alton, Bloomington, Ill.
1895	Miner, W. H		669 Rookery Building, Chicago, Ill.
1908	Minick, Eli.		G. F. C. R., Lehigh Valley, Ashley, Pa.
1889	Minton, W. D		M. C. B., Texas & Pacific, Marshall, Tex.
1892	Mitchell, A. E		50 Church street, New York City.
1905	*Mitchell, Robt.*	1,000	*G. S. A., Pennsylvania, Beech Creek & Eastern Coal Co., Philadelphia, Pa.*
1904	Mitchell, W. A.		M. C. B., Missouri, Kan. & Texas, Sedalia, Mo.
1901	Mohun, John L		10 Bridge street, New York City.
1907	*Moir, Wm*	44,072	*M. S., Nor. Pac. Ry., Minn. & International R. R., St. Paul, Minn.*
1894	Monkhouse, H.		Compressed Air Co., Rome, N. Y.
1908	*Montgomery, H.*	5,372	*S. M. P., Bangor & Aroostook, Milo Jct., Me.*
1893	*Mooney, P. T.*	407	*M. C. B., Texas Central, Walnut Springs, Tex.*
1907	Moore, J. F		F. C. D., New York, Ontario & Western, Middletown, N. Y.
1903	*Morgan, A. L.*	16	*Supt., Wheeling Terminal R. R., Wheeling, W. Va.*
1889	Morris, W. S		813 W. Berry street, Ft. Wayne, Ind.
1901	*Morse, C. S*	15,835	*M. C. B., Wheeling & Lake Erie, Toledo, Ohio.*
1908	Moser, E. L.		C. D., Phila. & Reading, Reading, Pa.
1906	Mowery, J. N		M. E., Lehigh Valley, South Bethlehem, Pa.
1908	*Muhlfeld, J. E.*	78,544	*G. S. M. P., Balt. & Ohio, Baltimore, Md.*
1902	*Muncy, J. W.*	12,216	*M. C. B., C. St. P. M. & O., Hudson, Wis.*
1898	*Murdock, J. M*	8	*Bare Rock, Johnstown, Pa.*
1903	*Murphy, C. W.*	329	*Supt., Morgantown & Kingwood R. R., Morgantown, W. Va.*
1907	Nagahashi, Goro.		M. C. B., So. Manchurian Ry., Tairen, Manchuria.
1908	*Needham, E. F*	21,350	*Supt. L. & C. Dept., Wabash, Springfield, Ill.*
1908	Neel, T. M., Jr		M. E., Atlanta, Birmingham & Atlantic Ry., Fitzgerald, Ga.
1885	Nelson, E. D		Engr. Tests, Pennsylvania, Altoona, Pa.

LIST OF MEMBERS—*Continued.*

Date.	NAME.	No. of Cars Owned.	RAILROAD COMPANY AND ADDRESS.
1895	*Nettleton, W. A*	45,566	*G. S. M. P., Rock Island Lines, Chicago.*
1894	Neuffer, J. G	....	S. M., Illinois Central, Chicago, Ill.
1897	*Neward, F. H*	124	*M. M., Pontiac, Oxford & Northern, Pontiac, Mich.*
1902	*Nichols, L. T*	104	*G. M., Carolina & Northwestern Ry., Chester, S. C.*
1908	*Nicholson, John.*	740	*S. M. P., St. Louis, Brownsville & Mexico, Kingsville, Tex.*
1904	*Nicholson, T*	455	*M. M., Louisiana Ry. & Nav. Co., Shreveport, La.*
1908	Niles, F. H.	....	Prest., Blue Island Car & Equip. Co., Chicago.
1897	*Nuttall, W. H*	550	*M. M., Manistee & North-Eastern, Manistee, Mich.*
1888	O'Brien, Jno. H.	....	M. C. B., Mexican Central, Aguascalientes, Mex.
1896	O'Herin, W	....	S. M. P. & E., Mo., Kan. & Texas, Parsons, Kan.
1897	*O'Leary, D.*	421	*M. M., Columbia & Puget Sound , Seattle, Wash.*
1905	Onderdonk, J. R.	....	Engr. Tests, B. & O. R. R., Baltimore, Md.
1893	Orchard, J. H	....	F. C. D., Del. & Hudson Co., Carbondale, Pa.
1906	Osman, H. L	....	S. C. D., Morris & Co. Refr. Line, Chicago.
1907	Osterman, H. C.	....	G. M., Osterman Mfg. Co., Chicago, Ill.
1903	Ott, Wm. B	....	Asst. E. M. P., Pennsylvania, Altoona, Pa.
1900	*Parish, Le Grand.*	58,687	*S. M. P., Lake Shore & Michigan Southern, L. E. & W., Chicago, Indiana & Southern, Cleveland, Ohio.*
1904	Park, P. D	....	M. S., Reid-Newfoundland Co., St. John's, Newfoundland.
1905	*Park, S. T*	19,572	*S. M. P., Chicago & Eastern Illinois, Danville, Ill.*
1896	Parker, T. E	....	South Omaha, Neb.
1902	Parks, R. H.	....	M. C. B., Mer. Desp. Trans. Co., Despatch, N. Y.
1903	Passmore, H. E.	....	M. M., Toledo & Ohio Central Ry., Kenton, Ohio.
1881	Patterson, J. S.	....	Galena Signal-Oil Co., Cincinnati, Ohio.
1904	*Paxton, Thomas*	2,461	*M. M., El Paso & Southwestern, El Paso, Tex.*
1904	Payne, H. R	....	V. P., Union Tank Line, New York City.
1908	*Pearce, H. C*	3,100	*American Refr. Trans. Co., St. Louis, Mo.*
1900	Pearse, H.	....	Loco. & Car Supt., B. A. & R. Ry., La Quinta, Rosario de Santa Fe, S. A.
1907	Pearson, W. H	....	G. C. F., Canadian Pacific, Farnham, Que., Can.
1889	*Peck, Peter H.*	990	*M. M., C. & W. I. R. R. and Belt Ry., Chicago, Ill.*
1905	Peiffer, Chas. E.	....	F. C. R., Lehigh Valley, Sayre, Pa.
1899	Percy, Wm	....	M. C. B., Wis. Central, Fond du Lac, Wis.
1901	*Perine, D. M*	10,000	*S. M. P., Penna. R. R., Pittsburgh, Pa.*
1901	Perry, H. M.	....	Perry Side Bearing Co., Chicago, Ill.
1907	*Persch, J. C.*	3	*Mercer Valley R. R., Pittsburg, Pa.*
1901	Pettis, C. D	....	303 Ry. Exchange, Chicago.
1896	Pew, R. C.	....	S. C. D., Bay Terminal, Toledo, Ohio.
1906	Pfahler, F. P	....	M. E., Wheeling & Lake Erie, Norwalk, Ohio.
1895	Pflager, H. M.	....	Commonwealth Steel Co., St. Louis, Mo.
1908	*Phillips, A. B*	272	*S. M. P., Tonopah & Goldfield, Tonopah, Nev.*
1899	Phillips, C	....	M. M., New Orleans & North-Eastern, Meridian, Miss.
1906	Phipps, D. L	....	Supt., Chicago Refrgr. Car Co., Chicago, Ill.
1908	*Pickard, F. C.*	1,085	*M. M., Miss. Cent. R. R., Hattiesburg, Miss.*
1906	Pilcher, J. A.	....	M. E., Norfolk & Western, Roanoke, Va.
1890	*Plank, P. D*	750	*M. M., Louisville, Henderson & St. Louis, Cloverport, Ky.*

LIST OF MEMBERS—*Continued.*

Date.	NAME.	No. of Cars Owned.	RAILROAD COMPANY AND ADDRESS.
1908	Poole, A. J.		G. M. M., Seaboard Air Line, Portsmouth, Va.
1890	Porcher, Sam'l.		Asst. to P. A., Pennsylvania, Philadelphia, Pa.
1908	*Posson, E.*	54,854	*Engr. Car Const., A. T. & S. F. Ry., Chicago, Ill.*
1905	Pratt, E. W		M. M., Chicago & North-Western, Missouri Valley, Iowa.
1896	*Prescott, C. H*	131	*M. M., Spokane International, Spokane, Wash.*
1900	Prince, S. F., Jr.		122 W. 49th street, New York City.
1896	*Purves, T. B., Jr.*	16,006	*S. M. P., Denver & Rio Grande, Denver, Colo.*
1905	Putnam, C. H		C. C. I., Atlanta, Birmingham & Atlantic, Waycross, Ga.
1897	*Quackenbush, A. W.*	845	*M. M., Kansas City & Northern Connecting Ry., Quincy, Omaha & K. C., Milan, Mo.*
1899	Quayle, R.		S. M. P. & M., Chicago & North-Western, Chicago, Ill.
1901	Quereau, C. H		Supt. Elec. Eqpmt., N. Y. C. & H. R., New York City.
1904	*Raidler, W. P*	1,012	*M. M., Green Bay & Western, Green Bay, Wis.*
1902	Ramsdell, T. M		M. C. B., Chesapeake & Ohio, Richmond, Va.
1896	*Ramsey, J. C*	197	*M. M., St. Louis, Watkins & Gulf, Lake Charles, La.*
1895	Rasbridge, R. B		C. C. I., Philadelphia & Reading, Reading, Pa.
1903	*Reading, R. K*	13,000	*S. M. P., B. & A. V. Div., Penna. R. R., Buffalo, N. Y.*
1906	*Records, J. W*	600	*M. M., St. L., Rocky Mountain & Pacific, Cimarron, N. M.*
1905	Rees, Henry		G. C. F., Northern Pacific, Missoula, Mont.
1897	Reiley, B		Foreman, L. & C., D. R. I. & N. W. Ry., Davenport, Iowa.
1900	*Rhodes, L. B*	3,212	*M. M., Ga. Sou. & Flor., Macon & Birm., Macon, Ga.*
1908	Richardson, W. P.		M. E., Pittsburgh & Lake Erie, Pittsburgh, Pa.
1901	*Richmond, W. H.*	1,281	*M. M., L. S. & I., Munising, Marquette & Southeastern, Marquette, Mich.*
1898	Rigby, Jason		Buenos Ayres & Rosario, 3 Coleman street, London, E. C., Eng.
1903	Rivett, Richard		G. C. I., Union Pacific R. R., Omaha, Neb.
1903	Roberts, L. D		C. J. I., A. T. & S. F. Ry., C. R. I. & P. Ry., D. & R. G. R. R., Mo. Pac. Ry., Colo. & Wyo. R. R., Pueblo, Colo.
1905	Robider, W. J		G. F. C. D., Central of Georiga, Savannah, Ga.
1906	Robins, S. P.		Chief Draughtsman, Can. Pac. Ry., Montreal, Can.
1907	Rockfellow, W. E		G. C. F., N. Y. C. & H. R. R. R., Oswego, N. Y.
1904	Rockwell, C. H		O. M. Edwards Co., 705 Fisher Building, Chicago, Ill.
1900	*Rodgers, J. G*	1,242	*Supt., N. Y., Phila. & Norfolk, Cape Charles, Va.*
1896	Rogers, M. J		1008 W. 24th street, Kansas City, Mo.
1904	Rohrback, G. T.		Iola, Kan.
1900	Rollins, J. L.		
1882	Rommell, Geo		D. M. M., Phila. & Reading, Wilmington, Del.
1906	*Roope, Thos*	17,465	*S. M. P., Chgo., Burlington & Quincy, Lincoln, Neb.*
1908	*Rose, F. E*	5	*Supt., Colorado Southeastern, Hastings, Colo.*
1905	Rosing, W. H. V.		M. E., Mo. Pacific, St. Louis, Mo.
1907	Ross, D. C		M. C. B., Mich. Cent. R. R., Detroit, Mich.
1906	*Rossetter, A. L.*	2,811	*S. M. P., Chicago, Peoria & St. Louis, Jacksonville, Ill.*
1907	*Rumney, T.*	59,299	*Gen. Mech. Supt., Erie R. R., New York City.*
1903	Russum, T. H		S. P. C. D., Balto. & Ohio R. R., Baltimore, Md.
1891	*Ryan, J. J*	16,308	*S. M. P., Sou. Pac. Co. (Atlantic Syst.), Houston, Tex.*
1906	Rydberg, C. F		G. C. F., Canadian Pacific, Montreal, Can.

LIST OF MEMBERS—*Continued.*

Date.	NAME.	No. of Cars Owned.	RAILROAD COMPANY AND ADDRESS.
1903	*Safford, V. P*	200	*Mgr., Mexican Northern Ry., Escalon, Mex.*
1908	Sage, R. V		C. E. Steel Car Dept., Cambria Steel Co., Johnstown, Pa.
1908	Sakuma, T.		M. E. Dept., Govt. Rys. of Japan, Stimboshi, Tokyo, Japan.
1892	*Sanderson, R. P. C*	2,099	*S. M. P., The Virginian Ry., Norfolk, Va.*
1900	*Scheffer, F. H*	10,232	*S. M. P., Nash., Chatt. & St. Louis, Nashville, Tenn.*
1885	Schlacks, Henry		1086 Sheridan Road, Chicago, Ill.
1906	Schmoll, G. A.		S. M. P., Balt. & Ohio, Wheeling, W. Va.
1906	*Schneider, M. J.*	5,000	*S. M. P., Nat'l R. R. of Mexico, Laredo, Tex.*
1908	Schnepel, J. H		C. D., N. Y. C. & H. R. R. R., New York City.
1887	*Schroyer, Chas. A*	59,400	*S. C. D., Chicago & North-Western, Chicago, Ill.*
1908	Schulze, R. W		G. C. F., G. C. & S. F. Ry., Cleburne, Tex.
1903	*Scofield, Ira*	100	*Toledo & Western Ry., Sylvania, Ohio.*
1908	*Scott, J. H..*	248	*Supt., Tremont & Gulf, Winfield, La.*
1904	Scully, P.		F. C. D., N. O. & N. E., New Orleans, La.
1903	Searles, E. J.		702 Newington ave., Baltimore, Md.
1907	*Seddon, C. W.*	7,450	*S. M. P., D. M. & N. Ry., Proctor, Minn.*
1900	Seifert, S. P		Asst. Foreman, Norfolk & Western, Roanoke, Va.
1902	Seley, C. A.		M. E., C. R. I. & P., R. 700, Rock Island Depot, Chicago.
1907	Selloy, S. H.		G. F. C. D., Boston & Albany, Allston, Mass.
1908	*Sergeant, Lewis*	95	*Supt., Chgo., Kalamazoo & Saginaw, Kalamazoo, Mich.*
1904	Setzekorn, C		Supt., American Car & Foundry Co., Madison, Ill.
1906	Shackford, J. M		C. D., Dela., Lack. & Western, Scranton, Pa.
1907	*Shafer, Geo.*	18	*Supt., Norfolk & Portsmouth Belt Line R. R., Elizabeth River R. R., Port Norfolk, Va.*
1898	*Sharp, W. E*	14,000	*Supt., Armour Car Lines, Continental Fruit Exp., Chicago.*
1908	Shaw, B. S.		M. M., Durham & Southern, Durham, N. C.
1907	Shea, R. T.		Insp. Tools & Mach., N. Y. C. Lines, New York City.
1905	*Shearman, C. S*	360	*Chicago Jct., Chicago, Ill.*
1903	Shelton, John		Chicago, Ill.
1904	*Shields, A.*	8,262	*M. M., Canadian Northern, Winnipeg, Man., Can.*
1907	Shone, Wm		G. F., N. Y. C. & H. R. R. R., Buffalo, N. Y.
1906	*Shreve, W. J*	390	*M. M., Minn. & Rainy River, Deer River, Minn.*
1908	Siemantel, Geo		G. M. M., Ft. Worth & Denver City Ry., Childress, Tex.
1891	Simons, J. E		505 Fisher Building, Chicago, Ill.
1905	Simpson, T. D.		M. C. B., N. Y., New Haven & Hartford, Readville, Mass.
1902	*Singer, Frank*	775	*F. & C. C. Rys., Colorado Springs, Colo.*
1907	Sitterly, W. H.		G. C. I., Pennsylvania R. R., Buffalo, N. Y.
1903	Slagle, E. R		Mgr., Pullman Co., Shops, Chicago, Ill.
1900	Slayton, C. E.		810 North 10th street, St. Joseph, Mo.
1900	*Slayton, F. T.*	1,000	*M. M., St. Joseph & Grand Island, St. Joseph, Mo.*
1904	Sloan, T. W.		F. C. D., New Orleans & Northwestern, Vidalia, La.
1890	*Small, H. J*	34,374	*G. S. M. P. & E., Southern Pacific, San Francisco, Cal.*
1907	*Small, J. W*	587	*S. M. P., Cananea, Yaqui River & Pacific, Tucson, Ariz.*
1893	*Smith, A. D*	725	*G. S., Cornwall & Lebanon, Lebanon, Pa.*
1907	Smith, B. T.		G. F., West Jersey & Sea Shore R. R., Camden, N. J.
1904	*Smith, E. O*	200	*M. M., St. Louis & Hannibal, Hannibal, Mo.*
1893	Smith, F. B		35 Hassard street, Jamestown, N. Y.
1906	Smith, F. T		F. C. R., Erie, Cleveland, Ohio.
1904	*Smith, G. W.*	24,000	*S. M. P. & M., Mo. Pacific, St. Louis, Mo.*
1907	Smith, M. W		M. M., Tampa & Jacksonville R. R., Gainesville, Fla.
1906	Smith, P. G.		G. F., Maine Central, Portland, Me.
1901	Smith, R. D.		A. S. M. P., Boston & Albany, Boston, Mass.

LIST OF MEMBERS—*Continued.*

Date.	NAME.	No. of Cars Owned.	RAILROAD COMPANY AND ADDRESS.
1897	*Smith, R. E*	25,516	*Asst. to Gen. Mgr., Atlantic Coast Line, Wilmington, N. C.*
1891	Soule, R. H		1571 Beacon street, Brookline, Mass.
1897	*Spoor, C. E*	5,008	*M. C. B., Buffalo & Susquehanna, Galeton, Pa.*
1900	Squire, W. C		Consulting Engr., 209 Western Union Bldg., Chicago, Ill.
1905	Stansbury, C. M		M. M., Boca & Loyalton R. R., Loyalton, Cal.
1892	*Stark, F. H*	3,555	*S. R. S., Pittsburg Coal Co., Coraopolis, Pa.*
1908	Stephens, J. E.		G. C. I., Del., Lack. & West., Scranton, Pa.
1904	*Stewart, A*	58,286	*G. S. M. P. & E., Southern, Washington, D. C.*
1905	*Stewart, C. J*	467	*M. M., Central New England, Hartford, Conn.*
1904	Stewart, M. D		Fitz-Hugh Luther Co., Chicago, Ill.
1897	*Stiffey, S. S*	28,073	*G. S. M. P., Hocking Valley Lines, Columbus, Ohio.*
1907	*Stigger, Frank*	25	*Ky. & Ind. Bridge & R. R. Co., Louisville, Ky.*
1906	Stillwagon, G. W		M. C. B., Pitts., Shawmut & Northern, St. Marys, Pa.
1900	Stimson, O. M		5006 Michigan ave., Chicago, Ill.
1900	Streicher, Chas		Keith Car & Mfg. Co., Sagamore, Mass.
1907	Stretzinger, Chas		F. C. D., New Orleans Term. Ry., New Orleans, La.
1905	*Stringham, J. S.*	132	*Delray Connecting, Detroit, Mich.*
1901	Sullivan, J. J		G. M. M., Louisville & Nashville, Birmingham, Ala.
1903	Sumner, Eliot		A. E. M. P., Pennsylvania, Jersey City, N. J.
1907	Sutherland, T		M. C. B., Grand Trunk, Montreal, Can.
1900	Susuki, S		S. M. P., Kinshiu, Moji, Japan.
1900	Swanson, Nelson.		F. C. S., Hawthorn, Nebagamon & Superior, Lake Nebagamon, Wis.
1906	*Sweringen, F. H*	8,316	*M. M., Street's Western Stable Car Line, Chicago, Ill.*
1895	Swift, H. H		M. C. B., Cincinnati, Hamilton & Dayton, Lima, Ohio.
1903	Swoyer, H		Rogers Loco. Works, Paterson, N. J.
1899	Symington, T. H.		Calvert Bldg., Baltimore, Md.
1898	Symons, W. E.		Pioneer Cast Steel Truck Co., Chicago, Ill.
1901	*Tally, W. J*	21	*Actg. Supt., Raleigh & Western, Cumnock, N. C.*
1903	Tanaka, F		Imp. Govt. Rys., Shimbashi, Tokyo, Japan.
1904	Tatum, Jno. J.		S. F. C. D., Baltimore & Ohio, Baltimore, Md.
1897	*Tawse, R*	8,807	*M. M., Ann Arbor, Detroit, Toledo & Ironton, Owosso, Mich.*
1908	*Taylor, F. W*	87	*Keweenaw Central, Hancock, Mich.*
1901	*Taylor, H. D*	46,551	*S. M. P., Philadelphia & Reading, Reading, Pa.*
1905	*Taylor, J. T.*	500	*G. M., St. Louis & O'Fallon, East St. Louis, Ill.*
1908	Tennant, M. P.		Asst. Loco. Supt., Jamaica, Govt. Ry., Kingston. Jamaica.
1906	*Tewkesbury, E. M.*	60	*G. S., South Buffalo, Buffalo, N. Y.*
1908	Thiele, C. F		G. C. I., P. C. C. & St. L. Ry., Columbus, Ohio.
1904	*Thomas, F. H*	40	*Supt., Bellefonte Central, Bellefonte, Pa.*
1904	Thomas, H. T		M. M., Detroit & Mackinac, East Tawas, Mich.
1902	Thomas, I. B.		A. E. M. P., Pennsylvania, Altoona, Pa.
1906	*Thompson, Geo*	400	*S. M. P., Denver, Northwestern & Pac., Denver, Colo.*
1903	Thompson, W. O.		M. C. B., N. Y. C. & H. R., E. Buffalo, N. Y.
1906	Thomson, S. G.		Asst. to G. M., Pennsylvania, Philadelphia, Pa.
1902	Thornton, Chas. J		Loco. Supt., United Rys. of Havana, Havana, Cuba.
1894	*Tonge, Jno.*	4,108	*M. M., Minneapolis & St. Louis, Minneapolis, Minn.*
1907	Tonry, J. T		G. C. F., Baltimore & Ohio, Zanesville, Ohio.
1905	*Torrey, F. A*	34,931	*S. M. P., Chicago, Burl. & Quincy, Chicago, Ill.*
1904	Townsend, H. P		St. Croix Paper Co., Calais, Me.

LIST OF MEMBERS—*Continued.*

Date.	NAME.	No. of Cars Owned.	RAILROAD COMPANY AND ADDRESS.
1903	Treleaven, T. A.	....	M. C. B., Grand Trunk Ry., London, Ont., Can.
1904	*Trimyer, H. L*	14,578	*M. C. B., Seaboard Air Line, Portsmouth, Va.*
1906	Turner, Amos	....	M. M., Lehigh Valley, Easton, Pa.
1895	Turner, J. S	....	24 Broad street, New York City.
1889	*Turner, L. H*	17,253	*S. M. P., Pittsburg & Lake Erie, Pittsburg, Pa.*
1908	Turney, E. E.	....	G. C. F., C. H. & D. Ry., Lima, Ohio.
1907	*Tyler, L. L.*	435	*M. M., Tacoma Eastern, Tacoma, Wash.*
1904	Uddenberg, C. E. ...	....	Asst. S. M. P., Swedish Govt. Rys., Baden, Sweden.
1908	Underwood, S. S. ...	....	C. D., Grand Trunk Ry., Montreal, Que., Can.
1896	Van Alstyne, D.	....	American Loco. Co., New York City.
1907	*Van Brimer, Geo.* ...	446	*Supt., Colorado & Wyoming Ry., Pueblo, Colo.*
1907	Van Buren, C. W ...	....	D. C. F., Canadian Pacific, Montreal, Can.
1904	*Van Buskirk, H. C* ..	8,120	*S. M. P., Colorado & Southern, Denver, Colo.*
1903	Vaughan, H. H	....	Asst. to V.-P., Canadian Pacific, Montreal, Can.
1906	*Vehslage, F. C*	461	*Spokane & Inland Empire, Spokane, Wash.*
1903	Vernet, C. C.	....	S. M. P. & R. S., Western Ry. of Havana, Havana, Cuba.
1907	*Vincent, M. M*	3,000	*A. G. M., National Car Lines, Chicago, Ill.*
1892	Vogt, A. S	....	M. E., Pennsylvania, Altoona, Pa.
1889	Voss, Wm..........	....	American Car & Foundry Co., Wilmington, Del.
1890	Waitt, A. M.	....	165 Broadway, New York City.
1904	Wallace, W. G.	....	American Steel Foundries, Chicago, Ill.
1907	*Wallis, J. T.*	10,000	*S. M. P., Northern Central Ry., Williamsport, Pa.*
1899	*Walsh, F. O*	1,421	*M. M., At. & W. Pt. and W. Ry. of Ala., Montgomery, Ala.*
1902	*Walsh, J. F*	36,315	*S. M. P., Chesapeake & Ohio, Richmond, Va.*
1906	Walsh, W. F	......	M. M., Virginia Air Line Co., Lindsay, Va.
1903	*Waters, J. J.*	2,953	*S. M. D., Mex. Inter. Ry., Ciudad Porfirio Diaz, Mex.*
1893	*Watts, A. H*	1,855	*S. M. P., Cin. Northern, Van Wert, Ohio.*
1894	Waughop, Chas.	....	Chief Joint Car Insp., East St. Louis, Ill.
1908	*Weiler, M. H.*	614	*T. M., Carolina Clinchfield & Ohio Ry., Johnson City, Tenn.*
1897	Weir, Henderson. ...	....	Harlan & Hollingsworth Co., Wilmington, Del.
1906	Weist, E. N	....	M. M., Manistee & North-Eastern, Manistee, Mich.
1907	*Weitzel, Harry.*	84	*Cananea Cons. Copper Co.'s Ry., Cananea, Sonora, Mex.*
1904	*Welch, Chas. H*	1,190	*M. M., Midland Valley, Excelsior, Ark.*
1890	*West, Geo. W*	7,805	*S. M. P., N. Y., Ontario & Western, Middletown, N. Y.*
1904	Westbrook, C. W ...	....	M. C. B., Gulf & Ship Island, Gulfport, Miss.
1897	Westervelt, Jos	....	M. C. B., N. Y. C. & H. R., East Rochester, N. Y.
1886	White, David.......	....	North Battleford, Saskatchewan, Can.
1908	White, J. E	....	M. M., Louisville & Nashville, Pensacola, Fla.
1898	Whyte, F. M	....	C. M. E., New York Central Lines, Room 610, Grand Central Depot, New York City.
1891	Wilcox, W. J	....	M. M., Las Vegas & Tonopah, Las Vegas, Nev.
1907	*Wilder, J. C.*	1,000	*Supt., McCloud River, McCloud, Cal.*
1902	*Wildin, G. W.*	37,354	*M. S., N. Y. N. H. & H. R. R., New Haven, Conn.*

LIST OF MEMBERS—*Continued.*

Date.	NAME.	No. of Cars Owned.	RAILROAD COMPANY AND ADDRESS.
1890	Williams, E. A.		96 Lembeck avenue, Jersey City, N. J.
1906	*Williams, R. B*	115	*G. M., Delaware & Eastern, Margaretville, N. Y.*
1903	*Williams, R. H*	200	*Car Agent, Fairmount Coal Co., Baltimore, Md.*
1908	Wilson, R. D		Asst. C. C. I., Phila. & Reading, Reading, Pa.
1902	*Wilson, W. H*	14,366	*S. M. P., Buffalo, Roch. & Pitts., Du Bois, Pa.*
1908	Wirt, G.		M. M., C. C. C. & St. L., Delaware, Ohio.
1905	*Wolf, T. L*	15	*G. S., St. Louis, El Reno & Western, Guthrie, Okla.*
1895	Worhle, John		Chief Joint Car Insp., Columbus, Ohio.
1903	Worsdell, Wilson		C. M. E., Northeastern Ry. Co., Gateshead, Eng.
1908	*Wright, J. H*	30	*Prest., Arkansas Cent., Ft. Smith, Ark.*
1902	Wright, R. V.		285 N. 20th street, East Orange, N. J.
1907	*Wyman, R. L.*	599	*M. M., Lehigh & New England, Bethlehem, Pa.*
1908	*Yeager, Thos*	433	*M. M., Ill. So., Sparta, Ill.*
1903	Yergy, J. P		Insp., Passenger Equipment Penna. R. R., Philadelphia, Pa.
1900	York, Francis C.		Loco. and Car Supt., B. A. & P. Ry., Junin Estacion, Buenos Ayres, Arg. Rep., S. A.
1899	*Yould, Wm*	503	*M. S., Dominion Atlantic, Kentville, N. S., Can.*
1902	Young, C. B.		M. E., Chicago, Burlington & Quincy, Chicago, Ill.
1908	Young, C. D.		A. E. M. P., Pennsylvania Lines West, Columbus, Ohio.
1905	Young, J. P		G. F. C. D., Missouri Pacific, St. Louis, Mo.
1902	Zeug, O. F		M. C. B., Union Refr. Transit Co., Milwaukee, Wis.

Total number of cars, 2,292,799.

LIFE MEMBERS.

Date.	NAME.	Railroad Company.	Address.
1873	**Bray, F. O**		Adrian, Mich.
1883	**Chamberlain, J. T**		95 Otis street, Medford, Mass.
1888	**Cory, Charles H**		Lima, Ohio.
1873	**Denver, James**	N. Y., New Haven & Hartford	New Haven, Conn.
1882	**Doran, J. E**	Boston & Albany	Rensselaer, N. Y.
1870	**Hackett, Geo**	Philadelphia & Reading	Elizabeth, N. J.
1872	**Kirby, John**	Lake Shore & Michigan Southern	Adrian, Mich.
1867	**Levan, J. P.**	Pennsylvania	Altoona, Pa.
1873	**McIlwain, J. D**	501 Ferguson Block	Pittsburg, Pa.
1875	**McWood, Wm.**	Grand Trunk	Montreal, Can.
1873	**Robson, A. C**	58 Park street	Buffalo, N. Y.
1885	**Rhodes, G. W**	St. Louis Road	Quebec, Can.
1883	**Steinbrenner, A. G.**	1317 East Madison ave	Cleveland, Ohio.
1883	**Thomas, W. H**	4230 Spruce street	Philadelphia, Pa.
1871	**Webster, H. A**	Manhattan, 98th st. and 3d ave.	New York City.
1887	**Welsh, Benjamin.**		Sacramento, Cal.
1882	**Wicks, Casper.**	Cumberland Valley	Chambersburg, Pa.

ASSOCIATE MEMBERS.

Date.	NAME.	Railroad Company.	Address.
1904	**Ames, Jno. McEwen.**	American Car & Foundry Co	165 Broadway, N. Y.
1902	**Fowler, Geo. L.**		53 Broadway, N. Y.
1902	**Goss, Prof. W. F. M.**	University of Illinois.	Urbana, Ill.
1903	**Hibbard, Prof. H. Wade.**	Sibley College, Cornell University.	Ithaca, N. Y.
1905	**Hitt, Rodney**	*Asso. Editor Electric Ry. Journal.*	239 W. 39th st., N.Y.
1896	**Lane, F. W.**	239 W. 39th street.	New York City.
1903	**Pomeroy, L. R.**	Safety Car Heating and Lighting Co.	2 Rector st., N. Y.
1890	**Setchel, J. H.**		Cuba, N. Y.
1905	**Shepard, L. A**	Atha Steel Casting Co.	Newark, N. J.
1889	**Sinclair, A.**	Editor *Locomotive Engineering*	New York City.
1902	**Smith, W. A**	Manhattan Building	Chicago, Ill.
1906	**Stucki, A**	Farmers' Bank Building.	Pittsburg, Pa.
1901	**Whitridge, J. C.**	Buckeye Steel Castings Co.	Columbus, Ohio.

CONSTITUTION.

ARTICLE I.

NAME.

SECTION 1. The name of the Association shall be "The Master Car Builders' Association."

ARTICLE II.

OBJECTS AND LIMITS OF ACTION.

SECTION 1. The objects of this Association shall be the advancement of knowledge concerning the construction, repair and service of railroad cars, by discussions in common, investigations and reports of the experience of its members; to provide an organization through which the members, and the companies they represent, may agree upon such joint action as may be required to bring about uniformity and interchangeability in the parts of railroad cars, to improve their construction, and to adjust the mutual interest growing out of their interchange and repair; but the action of the Association shall have only a recommendatory character, and shall not be binding upon any of its members or the companies represented in it.

ARTICLE III.

MEMBERSHIP.

SECTION 1. There shall be three classes of members — Active, Representative and Associate Members. Each member must sign the Constitution or authorize the Secretary to sign for him.

SEC. 2. Any person holding the position of Superintendent of the Car Department, Master Car Builder, Assistant Master Car Builder, Assistant Mechanical Superintendent, Mechanical Engineer, Assistant Mechanical Engineer, Assistant Engineer of Motive Power, Chief Draftsman, Foreman of a Railroad Car Shop, Joint Car Inspector, or one representative from each Car Manufacturing Company or other company owning over one thousand cars, which are not in process of purchase by other parties, may become an **Active Member** by paying his dues for one year. Unless expelled from the Association his membership shall continue until his written resignation is received by the Secretary.

SEC. 3. Any person having a practical knowledge of car construction may become a representative member by receiving a written appointment from president, general manager or general superintendent of any railroad to represent its interests in the Association; provided, that no representative member shall represent more than one railroad or system of roads under one general manager or general superintendent.

Similarly, any person having a practical knowledge of car construction may become a representative member from a private car company, by presenting a written appointment from the president, vice-president or general manager of the company; provided, that said company owns or operates one thousand cars or over.

Such member shall have all the privileges of an active member, including one vote on all questions, and in addition thereto shall, on all measures pertaining to the adoption of standards or the expenditure of money, have one more vote for each full one thousand cars which are owned, or which are in use or process of purchase by the road system or private car company which he represents. His membership shall continue until notice is given the Association of his withdrawal, or of the appointment of his successor.

No railroads or system of roads or private car lines under one general manager or general superintendent shall have more than one representative member.

In the enumeration of four, six, eight or more wheeled cars, four axles to count as one car.

Sec. 4. Civil engineers or other persons having such knowledge of science, or practical experience in matters pertaining to the construction of cars, as would be of especial value to the Association or railroad companies, may become Associate Members on being recommended by three members not Associates. The names of such candidates shall then be referred to the Executive Committee, which shall report to the Association on their fitness for such membership. They shall be elected by ballot at any regular meeting of the Association, held not less than six months after a candidate has been proposed, and five dissenting votes shall reject. The number of Associate Members shall not exceed twenty. Associate Members shall be entitled to all the privileges of Active Members, excepting that of voting and being elected to office in the Association.

Sec. 5. Members of this Association, either active or representative, who have been in good standing twenty years, may become candidates for life membership, on the recommendation of the Executive Committee. The names of such members shall be referred to the Association in convention for election by ballot at any regular meeting of the Association, and five dissenting votes shall reject.

Sec. 6. Any member who, during the meetings of the Association, shall be guilty of dishonorable conduct which is disgraceful to a railroad officer and a member of the Association, or shall refuse to obey the Chairman when called to order, may be expelled by a vote of two-thirds of the members present at any meeting held within one year from the date of the offense.

ARTICLE IV.

OFFICERS.

Section 1. The officers of the Association shall be a President, three Vice-Presidents, a Treasurer, Secretary, and six Executive Members. The six Executive Members, with the President, Vice-Presidents and Treasurer, shall constitute the Executive Committee.

ARTICLE V.

DUTIES OF OFFICERS.

Section 1. The duties of all officers shall be such as usually pertain to their offices, or may be delegated to them by the Executive Committee of the Association.

ARTICLE VI.

EXECUTIVE COMMITTEE.

SECTION 1. The Executive Committee shall exercise a general supervision over the interests and affairs of the Association, recommend the amount of the annual assessment, call, prepare for and conduct general conventions, and make all necessary purchases, expenditures and contracts required to conduct the current business of the Association, but shall have no power to make the Association liable for any debt to an amount beyond that which at the time of contracting the same shall be in the Treasurer's hands in cash, and not subject to prior liabilities. All expenditures for special purposes shall only be made by appropriations acted upon by the Association at a regular meeting.

SEC. 2. The Executive Committee shall make a report of the proceedings of each of its meetings, such reports to be made accessible to all the members of the Association. It shall have the proceedings of the regular meetings of the Association published, subject to instructions from the latter. It shall have power to withhold from the published proceedings, papers and reports containing old matter readily found elsewhere, those specially meant to advocate personal interests, those carelessly prepared or controverting well-established facts, and those purely speculative or foreign to the purposes of the Association, or any which, in the opinion of the committee, are unworthy of publication; it being understood that this discretion shall always be exercised subject to the action of the Association.

SEC. 3. Two-thirds of the members of the Executive Committee may call special meetings of the Association, to be held not less than thirty days after a notice thereof has been mailed to each member of the Association.

SEC. 4. Five members of the Executive Committee shall constitute a quorum for the transaction of business.

ARTICLE VII.

ELECTION AND APPOINTMENT OF OFFICERS, AND TENURE OF OFFICE.

SECTION 1. The officers, excepting as otherwise herein provided, shall be elected at the regular meeting of the Association, held in June of each year, and the election shall not be postponed except by unanimous consent.

PRESIDENT AND TREASURER.

SEC. 2. The President and Treasurer shall be elected by written ballots by a majority of the votes cast, and shall hold office for one year, or until successors are chosen.

VICE-PRESIDENTS AND EXECUTIVE MEMBERS.

SEC. 3. The Vice-Presidents shall hold office for one year, and Executive Members for two years, or until successors are chosen. Three Vice-Presidents and three Executive Members to be elected each year; provided, however, that three of the latter shall be appointed by the President holding office at the time of the adoption of this amendment. The Executive Members thus appointed to hold office until successors are chosen at the annual meeting following.

SEC. 4. In the election of Vice-Presidents each Active and Representative Member may cast as many votes as there are Vice-Presidents to be elected. The number of votes may be given to one candidate or distributed among more, as the person entitled to cast them may choose. Executive Members shall be voted for in the same way. The three candidates for each of the offices named who receive the largest number of votes shall be declared elected.

SECRETARY.

SEC. 5. A Secretary, who may or may not be a member of the Association, shall be appointed by a majority of the Executive Committee at its first meeting after the annual election, or as soon thereafter as the votes of a majority of the members of the Executive Committee can be secured for a candidate. The term of office of the Secretary thus appointed, unless terminated sooner, shall cease at the first meeting, after the next annual election succeeding his appointment, of the Executive Committee organized for the transaction of business. Two-thirds of the members of the Executive Committee shall, however, have power to remove the Secretary at any time. His compensation, if any, shall be fixed for the time that he holds office by a vote of a majority of the Executive Committee. He shall also act as Secretary of the Executive Committee.

TREASURER.

SEC. 6. The Treasurer shall be required to give bonds to an amount which a majority of the members of the Executive Committee demand. No bill shall be paid by him for the Association, excepting for current expenses, until it has been certified by the person or persons authorized to contract it, and audited by the Executive Committee.

ARTICLE VIII.

COMMITTEES.

SECTION 1. At the first session of the annual meeting the President shall appoint a Nominating Committee of five members, who are not officers of the Association, and this committee shall send the names of nominees for officers of the Association to fill vacancies for the ensuing year to the Secretary before the election of officers is in order, and they shall be announced by him as soon as received. The election shall not be held until the day after such announcement, except by unanimous consent. Any three other members may nominate candidates for any office.

AUDITING COMMITTEE.

SEC. 2. At the first session of each annual meeting an Auditing Committee, consisting of three members not officers of the Association, to be nominated by any member who does not hold office, shall be elected in the same way as Vice-Presidents and Executive Members are voted for. This Auditing Committee shall examine the accounts and vouchers of the Treasurer and certify whether they have been found correct or not. After the performance of this duty they shall be discharged by the acceptance of their report by the Association.

COMMITTEE ON SUBJECTS FOR INVESTIGATION AND DISCUSSION.

SEC. 3. At each annual meeting the President shall appoint a committee whose duty it shall be to report at the next annual meeting subjects for investigation and discussion, and if the subjects are approved by the Association, the President, as hereinafter provided, shall appoint committees to report on them. It shall also be the duty of the committee to receive from members questions for discussion during the time set apart for that purpose. This committee shall determine whether such questions are suitable ones for discussion, and, if so, they shall so report them to the Association.

COMMITTEES OF INVESTIGATION.

SEC. 4. When the Committee on Subjects has reported and the Association approved of subjects for investigation, the President shall appoint special committees to investigate and report on them, and he may be authorized to appoint a special committee to investigate and report on any subject which a majority of the members present may approve of.

ARTICLE IX.

THE RECOMMENDATION OF STANDARDS.

SECTION 1. Any proposition recommending the adoption of standard constructions or practice shall be in writing and be accompanied by drawings if the latter are necessary for a clear understanding of the subject. Such proposition shall then be submitted to the Association for discussion, after which a vote shall be taken to decide whether the proposition shall be submitted for decision by letter ballot to all the members entitled to vote. If decided in the affirmative the Secretary, within three months from the time the vote of the Association is taken on such measure, shall send by mail to each member a blank ballot, and a copy of the proposed recommendation, with a report — to be approved by the Executive Committee — of the discussion thereon. Such ballot to be filled up, signed and remailed to the Secretary, who shall count all the ballots received within thirty days from the date that they were sent to members, and he shall then announce the vote in such manner as the Executive Committee may prescribe. Any recommendation securing two-thirds of the votes cast shall be adopted by the Association.

SEC. 2. All reports, resolutions and recommendations involving the use, or proposed use, by railroad companies, of any device or process which forms the subject matter of any existing patent, shall first be submitted to the Executive Committee, and shall be submitted to the Association only by the Executive Committee.

ARTICLE X.

ANNUAL CONTRIBUTIONS.

SECTION 1. Every member will be subject to the payment of annual dues, to be assessed at each annual meeting, to defray the necessary expenses of the Association, provided that no assessment shall exceed $8. Each Representative Member shall pay, in addition to his own dues so assessed, the same amount for each additional vote to which he is entitled.

Such dues shall be payable when the amount thereof is announced by the President at each annual meeting, and no member who is one year in arrears shall be entitled to a voice in the Association. The name of any member who is three years in arrears for dues may be struck from the list of members at the discretion of the Executive Committee.

ARTICLE XI.

AMENDMENTS.

SECTION 1. This Constitution may be amended at any regular meeting by a two-thirds vote of the members present, *provided* that written notice of the proposed amendment has been given at a previous meeting at least six months before.

BY-LAWS.

TIME OF MEETING.

I. The regular annual meeting of the Association shall be held in June of each year. The date of the commencement of such meeting shall be fixed by a committee consisting of the President, three Vice-Presidents and the Treasurer, acting jointly with a committee of the American Railway Master Mechanics' Association.

HOURS OF SESSION.

II. The regular hours of session shall be from 10 A.M. to 1:30 P.M. on the opening day, and from 9 A.M. to 1:30 P.M. on other days.

PLACE OF MEETING.

III. The place for each annual meeting shall be fixed at least six months before the date for the annual meeting, by a committee consisting of the President, three Vice-Presidents, and the Secretary, acting jointly with a committee of the American Railway Master Mechanics' Association.

QUORUM.

IV. At any regular meeting of the Association fifteen or more members entitled to a vote shall constitute a quorum.

ORDER OF BUSINESS.

V. The business of the meetings of the Association shall, unless otherwise ordered by a vote, proceed in the following order:

1st. Prayer.
2d. Reading the minutes of the last meeting.
3d. Address by the President.
4th. Admission of new members.

5th. Reports of Secretary and Treasurer.
6th. Assessment and announcement of annual dues.
7th. Appointment of Nominating and other committees.
8th. Election of Auditing Committee.
9th. Unfinished business.
10th. New business.
11th. Reports of committees.
12th. Reading and discussing questions propounded by members.
13th. Routine and miscellaneous business.
14th. Election of officers.
15th. Adjournment.

RULES GOVERNING THE CONDITION OF, AND REPAIRS TO, FREIGHT CARS FOR THE INTERCHANGE OF TRAFFIC.

VI. The revision of the Rules of Interchange shall be the special order of business at 10 o'clock A.M. on the second day of each annual convention, unless otherwise ordered.

QUESTIONS FOR DISCUSSION, SPECIAL ORDER OF.

VII. Unless otherwise ordered, the discussion of questions proposed by members shall be the special order at 12 o'clock M. of each day of the annual meeting.

DECISIONS.

VIII. The votes of a majority of the members present shall be required to decide any question, motion or resolution which shall come before the Association, unless otherwise provided.

DISCUSSIONS.

IX. No questions or discussions as to the regulation of wages, or the amount to be paid by the day, week or month, or the number of hours that shall constitute a day's work of employes, shall be allowed at the meetings of this Association.

X. No patentees or their agents shall be admitted in the meetings of the Association for the purpose of advocating the claims of any patent, or patentee, unless by unanimous consent.

XI. No member shall speak more than twice in the discussion of any question until all the other members who want to speak and have not been heard have spoken.

XII. Before a motion to close or end a discussion is submitted to a vote, the Chairman shall ask the question whether any other members desire to speak on the subject matter now before the convention, and he shall give an opportunity to any who wish to speak to say so. The motion shall then be submitted to a vote, and the proceedings be governed in accordance with the action of the Association.

CONVENTION

OF THE

MASTER CAR BUILDERS' ASSOCIATION.

1908.

WEDNESDAY'S SESSION.

President George N. Dow called the meeting to order at 10 o'clock A.M.

THE PRESIDENT: The past presidents of the Master Car Builders' Association and the president and past presidents of the Master Mechanics' Association will kindly take seats on the platform.

We have with us this morning the Rev. Newton D. Cadwell, Pastor of the Olivet Presbyterian Church, who will open the meeting with a Divine blessing.

Dr. Cadwell then invoked the Divine blessing.

THE PRESIDENT: We have with us this morning the Hon. Franklin P. Stoy, Mayor of Atlantic City, who has a few words he wishes to say to us. [Applause.]

MAYOR F. P. STOY: Mr. President, Ladies and Members of the Master Car Builders' Association: There is no doubt that for the last week or so you have been busily engaged devising plans to be present on this occasion. I understand that this is one of the greatest gatherings this institution has had since its organization. The sun, the moon, and the stars seem to have taken a delight in the last few hours in shining upon you as you have come to our shore, and I am here this morning to again extend you a hearty welcome.

A large number of you have been to the meetings of this Association time after time. I understand that the last two or three meetings here have been a great credit not only to this institution, but to Atlantic City in providing a suitable place for you to hold your convention. At this present meeting, in particular, I understand that there is at least one-third more space for your exhibits, one-third more people at the convention, and I trust that there will be at least one-third more pleasure for you here than you have had on the occasion of your previous meetings at Atlantic City. I need not speak to those who have had their time taken up not only in the day, but all times of the night, while they have been present with us, and that is due, perhaps, to the freedom of the city, which I have extended to you on two or three former occasions. I trust while you are here, holding your conventions under these delightful conditions, out over the sea, that this meeting will be a benefit to you not only individually, but collectively, and I am assured by the people of Atlantic City that they extend to you a hearty welcome. This welcome comes not only from the officials of the city, but from the whole fraternity of people who are managing this great resort, and we trust that the institution as it stands to-day in its meeting and its operations here will be a perfect success.

I know that you will not expect anything further from me than what has already been extended to you in former days; that is to say, a hearty welcome to the freedom of the city. I thank you! [Applause.]

THE PRESIDENT: We have with us this morning a long-time member of this Association, Mr. Eugene Chamberlin, whom I will call upon to respond to the Mayor's remarks.

MR. EUGENE CHAMBERLIN (N. Y. Central Lines): Mr. President, your Honor: The earnest manner in which you extend the hospitality of your beautiful city impresses us deeply and assures us that our lives have fallen in pleasant places, and your evident sincerity leads us to believe that at last we have found in you a friend whose gentle hand will guide us safely past all pitfalls that we in our innocence are so unaccustomed to, and whose tender voice will cause to appear as infinitesimal any direct charges that may be imposed against us by your world-famed hostelries. Your Honor, we believe that the most sincere appreciation of your generous and hearty welcome can be shown by our taking full advantage of it. [Applause.] And while we are within your gates we would like permission to keep in close "touch" with you. [Laughter and applause.] We would like your official dignity to appear to us as a "shield and bulwark" against all temptation and danger, because it is just possible that some of us, at least, quoting the lines of that beautiful hymn, "Will need thee every hour." [Applause.] I wish I were gifted with words to express to you and your people the importance of this vast gathering. Here assembled are men representing corporations who employ one person in every sixty-two of our vast population, corporations that own or control equipment in which is transported daily upwards of two millions of our restless people and thousands of tons of freight; representatives of these great corporations here assembled who are charged with the responsibility of maintaining that equipment in a condition that it may not imperil the life, limb or property of our citizens, a stupendous task, your Honor, and one that requires man's best thought and effort.

Here assembled, also, are the representatives of the great commercial industries of our country, men who, in whatever part of this broad land it may be their fortune to dwell, are as "welcome as the flowers of May," and whose presence here to-day "make our workday seem a holiday." Also here assembled are those men who wield "that weapon which is mightier than the sword" — the scribes, who upon the pages of the technical journals of this country record our deeds and misdeeds and, as a rule, treat us with absolute fairness.

Your Honor, that is not all. Here, attending these lords of creation, adding dignity, refinement and beauty to the scene, come these magnificent helpmeets, these wives, these daughters, these sweethearts, God bless them all! — here the self-reliant, broad-minded, generous women of the North, as graceful as the lily that bends its head to the northern breeze; here from the golden West that cultured, capable, womanly woman, as sweet to us as is the Michigan rose that clambers over the doorway of her prairie home; — here from the Middle, Eastern and New England States come those "Grande Dames" radiant with the culture and refinement that the great institutions of learning of the East doth bestow, yet, withal, as modest and sweet as the violet that nestles on the eastern hillside. And from the South, Oh! man, man, who amongst you can pay just tribute to the woman of the South, magnificent in her hospitality — handed down to us as a heritage from the time that Captain John Smith was entertained by Pocahontas in Virginia — queenly in her manner, with that soft, southern accent that would charm the heart of an anchorite, and sweet as the magnolia blossom that blooms in her southern home, here, your Honor, are they blended in one harmonious bouquet, before which we bow in admiration and bare our heads in appreciation, because they typify to us what we know they do to you, to your people, to the whole wide world — the highest ideal of American womanhood. [Applause.]

The President here read his address.

To the Members of the Master Car Builders' Association and Visitors:

With cordial greetings I meet you this morning on the opening of our forty-second annual convention.

To the ladies who have honored us with their presence, I extend the kindliest words of greeting and trust that their stay here will be one of unalloyed pleasure and of pleasant remembrance.

As we are assembled here to-day we do not look upon surroundings entirely unfamiliar, for pleasant recollections still linger in our memories of the last two conventions held in Atlantic City.

My business training and education have been along the lines of railroad affairs and especially in car construction and not on the rules of rhetoric; therefore, I do not appear before you with any flow of oratory, but shall endeavor to speak to you with precision and directness.

I am not unmindful of the great honor you have conferred by placing me in the high position I now occupy, and I bespeak your kind consideration and assistance in the conduct of the affairs of this convention that the purpose for which it was called can be attained.

Forty years ago this month this expression was made at the second annual convention of this Association, by the first president, Mr. A. W. Van Houten: "I trust that our deliberations will be harmonious and beneficial to ourselves and to the best interests of the railroad companies that we represent. Taking into consideration the millions of dollars, the expenditure of which the railroads entrust, in a great measure, to their respective Master Car Builders, it is important for us to consider the best and most economical way to expend such an amount of money with credit to ourselves and to the best interests of our respective companies."

If the above expression were true at that time, how much more applicable is it now?

At that time the cars represented could be named in hundreds, while now they are numbered in millions.

The two great objects of this Association are, first, the procurement of uniformity in car construction, and second, to secure the most economical results in the interchange of traffic between the railroads of the country. They are both so closely related that to secure the best results in interchange it is necessary that railroads carefully observe the standards adopted by the Association. Of course, we all know that the standards of car construction adopted by this Association are only recommendatory in character, but on the other hand, a closer observation of these standards will result in a decreased cost for conducting the interchange of cars, and thus promote one of the great objects of the Association. It may be said that our standards are not permanent in character; that changes are constantly being made; but the reason for this can not be laid exclusively to the door of the Master Car Builders' Association. The demands and conditions of the traffic and operating departments are as constantly changing, and as new conditions in operation arise, they must be met by new designs in car construction, and to the Master Car Builder the managing officer looks for results. It therefore behooves us to be alert at all times to meet these demands, and thus enhance the value of the work performed by the Association. With this object in view we are assembled here to-day, and I would ask your earnest and careful consideration of the various recommendations which will be presented to you during our deliberations.

Each year our standards are being more carefully scrutinized by the operating officers; the application of couplers of the vertical plane or M. C. B. type, the complete equipment of cars with air brakes, the adjustment of height of couplers as formulated by this Association have become the law of the land, and it has even been proposed to enact into law our standards relating to the protection of trainmen. It will thus be seen that more and more the actions of this Association are being recognized, and emphasizes to us the absolute necessity of paying close attention to what we adopt.

It is not my intention to point out in detail the various recommendations made by your committees; they have labored faithfully during the year, and the results are before you in their reports. I only bespeak your careful study.

In the past there has been some difficulty on the part of some of the members and some of the car builders to determine satisfactorily, from the published standards of the Association, important data on the protection of trainmen. When this was brought to my attention a special meeting of the Executive Committee was called, and as it was found that the work of the Committee on Standards was so onerous, it was decided to appoint a special committee to review the standards of the Association for the Protection of Trainmen with a view of increasing their usefulness by more complete illustrations, and at the same time recommend such modifications as might be necessary to meet the requirements of modern car construction. This committee's report is submitted to the convention with the reports of the other committees.

A few thoughts suggest themselves to my mind which this Association should consider.

First. The necessity for coöperation and coördination of the work of the various railway associations has led the American Railway Association to propose changes in its organization which will admit of more harmonious relations between the various railway associations, and at the same time tend to centralize the recommendations for authoritative action with that association. In view of the nature of a great deal of the work of the Master Car Builders' Association, it is important that this Association coöperate to the fullest extent with the American Railway Association, and in order that this may be accomplished, some change in the Constitution and By-Laws of the Master Car Builders' Association will be necessary.

Second. The Constitution at the present time does not provide for filling vacancies which may occur in the office of President and Vice-President or members of the Executive Committee, except by election at the convention, nor is it required that these officers of the Association and members of the Executive Committee should be actually engaged in the railway service. I would, therefore, recommend that the Constitution be changed to cover these points, after the subject is given full consideration by the proper committee.

Third. In the past a large list of subjects has been referred to the Association, and in the future I would recommend reducing the list so as to give better opportunity to investigate and discuss the subjects more thoroughly.

Fourth. The importance of the work of the Association is such that the members who accept membership on a given committee should do so with a realization of the work required of them and fully understand the necessity of attending as many meetings of the committee as the chairman may feel is necessary to call. It should be remembered that when a member fails to attend a committee meeting the committee is not only deprived of the benefit of his experience, advice and opinion, but the representation from a given district; as it is generally the practice, in appointing committees, to endeavor to cover, as far as possible, different portions of the country. I would urge the members of the Association to seek rather than avoid committee work. The subjects considered are all of moment to the railroads you represent and it is their interest as well as those of the Association which must be considered.

Fifth. In the past, it has been the practice by a great many repair men to ignore or neglect the use of the repair cards, as called for in

Rule 76, M. C. B. Rules of Interchange. Some look at this as a dishonest act on the part of repair men, but in my opinion it is only a case of neglect on the part of those making repairs. In order that the full benefit of the rule may be obtained, as was the intention of the members of this Association when it was adopted, I would recommend to all heads of car departments the issuing of such instructions to their repair men as would make it impossible for them to either ignore or neglect the use of this card, and thereby avoid the suspicion of dishonesty.

Sixth. The adoption of a standard M. C. B. coupler. Several years ago an ineffectual effort was made in that direction. I believe the time is now ripe for such action.

Seventh. There has been a steady increase in the use of steel in car construction. The steel car has come to stay, and I believe this Association should give attention to this important matter to the end that its use may be extended more and more. I would recommend the appointment of a committee on standard steel shapes.

Eighth. Several years ago the question of the adoption of standard dimensions for the box car recommended by the American Railway Association was considered, and a system of framing only adopted. The question was not given the consideration it deserves, and to my mind is one that should be revived and studied to a conclusion. This subject at that time was referred to us by the American Railway Association, and we should complete our work and carry out the instructions given us. The appointment of a committee on this subject should be considered by your Executive Committee.

The past year has been a strenuous one for the mechanical officer. When we met here a year ago our shops were being pushed to their fullest capacity to keep in motion the immense traffic offered the railroads, but during the early winter a depression in business overtook us which has rendered necessary a general policy of retrenchment. Under these varying circumstances it has required the exercise of the utmost care and wisdom to properly conduct the affairs of our department of railroad work.

Commingled with our pleasures and perplexities we have been called to lay aside our work for a time to mourn for some who met with us a year ago; who have traveled to that undiscovered country from whose bourne no traveler returns. During the year the Grim Reaper has taken from our ranks D. W. Hunter, James Macbeth, H. W. Watts, J. T. Kebler, O. Stewart, Robert McKenna and M. N. Forney.

The mention of the name of Mr. Forney recalls to our mind one who has been most active, if not *the* most active, in promoting the interests of this Association. No words of mine can fittingly express that feeling of love which permeates every fiber of our being for our former secretary, Mr. Forney. In the regular order of business committees will be named to prepare obituaries for incorporation in our Proceedings.

It is my desire at this time to call attention to the splendid exhibition of mechanical devices furnished for your inspection and study by our friends, the supply men. I trust that between the sessions of this convention you will take advantage of the splendid opportunity to become thoroughly acquainted with what is new and up-to-date in the various parts of car construction as exhibited on this pier.

Gentlemen, permit me to express the hope that the pleasures and benefits we derive from this meeting may be such that when we return to our homes we may be better equipped to shoulder the responsibilities of life with a greater degree of confidence and knowledge.

It is my desire that you all remain with us during our deliberations, but to those of our visitors who wish to retire, an opportunity will be given. There will now be an intermission of five minutes, after which we will proceed with the work of the convention as laid out in the program.

The following members registered:

Alter, William.
Anderson, G. T.
Appler, A. B.
Arp, W. C.

Barton, T. F.
Beaumont, H. A.
Benson, E. A.
Bentley, W. F.
Berry, L. W.
Bishop, G. C.
Blewett, S. H.
Bloxham, C. M.
Bossinger, H. C.
Bottomly, E. S.
Boutet, H.
Bradley, J. E.
Bradeen, J. O.
Brazier, F. W.
Bronner, E. D.
Brown, W. A.
Buker, Joseph.
Buker, James.
Bush, S. P.
Bushmeyer, C. J.
Bussing, G. H.

[illegible], J. R.
Cameron, J. E.
Carmer, J. R.
Carson, G. E.
Case, S. T.
Carr, W. K.
Chaffee, F. W.
Chaffee, E. F.
Chambers, J. S.
Chamberlain, E.
Chamberlain, J. T.
Christopher, J.
Chrysler, W. P.
Clark, F. H.
Clark, J. H.
Cleaver, F. C.
Coleman, James.
Collins, J. N.
Connolly, J. J.
Cook, T. R.
Corinth, A. B.
Cory, C. H.
Coulter, H.
Coutant, M. R.
Courson, J. F.
Craig, Andrew.
Crawford, D. F.
Crone, S. A.
Cromwell, O. C.
Cromwell, S. A.
Cullinan, John.
Curtis, T. H.

Davenport, C. W.
Deems, J. F.
Deibert, J. H.
Demarest, H. N.
Demarest, T. W.
DeVoy, J. F.
Dickinson, E. W.
Dickerson, S. K.
Dillon, S. J.
Divine, J. F.
Dodds, E. I.
Dodge, R. N.
Dow, G. N.
Downing, I. S.
Dunn, J. F.
Durborow, R. N.

Eberle, W. F.
Eckhart, John, Jr.
Eddy, F. H.
Elmer, Wm., Jr.
Ettenger, R. L.
Evans, R.C.
Everett, Ira.

Fay, A. R.
Feeley, T. M.
Fildes, Thos.
Flory, B. P.
Fogg, J. W.
Forsyth, William.
Fowler, G. L.

Fowler, W. E.
Fuller, C. E.

Gaines, F. F.
Gaskill, C. S.
Gauthier, J.
Geesey, R. W.
Gilbert, E. A.
Gilbert, E. B.
Gilbert, F. M.
Gilman, G. H.
Gorrell, W. T.
Goss, W. F. M.
Gray, B. H.
Gray, G. M.
Green, Herbert.
Grieves, E. W.
Goodnow, T. H.
Gordon, R. L.
Gould, J. E.

Hackling, Edw.
Hair, John.
Hall, W. B.
Hall, W. H.
Hamilton, William.
Hamilton, Tabor.
Hammett, P. M.
Hancock, G. A.
Hayes, A. C.
Hayward, H. S.
Hennessey, J. J.
Henry, W. C. A.
Hill, Rufus.
Hinckley, A. C.
Hibbard, H. Wade.
Hindman, S. M.
Hodgson, John.
Hogsett, J. W.
Hitt, Rodney.
Horrigan, John.
Howard, Frank.
Howard, John.
Hyndman, F. T.

Joughins, G. R.

Kalbaugh, I. N.
Keagy, C. O.
Kearney, Alex.
Keegan, J. E.
Kells, Willard.
Kellogg, W. L.
Kendall, A. L.
Kendig, R. B.
Kennedy, W.
Kent, F. S.
Kiesel, W. F., Jr.
Kilpatrick, R. F.
Kimmett, M. A.
Kinter, D. H.
Kleine, R. L.

LaMar, A.
LaRue, H.
Lane, F. W.
Leaman, John.
Lentz, J. S.
Lewis, H. L.
Lewis, W. H.
Lindstrom, Charles.
Lockwood, B. D.
Lungren, W. H.
Lovell, Alfred.

McCarthy, H. C.
McFarland, W. W.
McFeatters, F. R.
McIlvaine, C. L.
McIntosh, William.
McKee, G. S..
McKenna, R. F.
McNulty, F. M.
McRae, J. A.
McWood, William.
Maher, P.
Manchester, A. E.
Mandeville, H.
Manning, J. H.
Marden, J. E.
Marden, J. W.
Martin, J. H.
Mendenhall, C. M.

Mengel, J. C.
Meredith, H. P.
Millican, S.
Milliken, J.
Miller, E. A.
Miller, E. B.
Millar, E. T.
Miller, William.
Miller, R. S.
Mills, William.
Mitchell, A. E.
Moir, William.
Monkhouse, H.
Montgomery, H.
Moore, J. F.
Morris, W. S.
Moser, E. L.
Muhlfeld, J. E.
Murphy, C. W.

Nelson, E. D.
Nettleton, W. A.
Neward, F. H.

Onderdonk, J. R.
Orchard, J. H.
Osman, H. L.
Ott, Wm. B.

Parish, L. G.
Parker, T. E.
Park, S. T.
Passmore, H. E.
Patterson, J. S.
Payne, H. R.
Pearson, W. H.
Peck, P. H.
Perine, D. M.
Perry, H. M.
Pettis, C. D.
Phillips, C.
Pomeroy, L. R.
Poole, A. J.
Porcher, Samuel.
Pratt, E. W.
Purves, T. B., Jr.

Ramsdell, T. M.
Rasbridge, R. B.
Richardson, W. P.
Richmond, W. H.
Robider, W. J.
Rockwell, C. H.
Rockfellow, W. E.
Robbins, S. P.
Rhodes, L. B.
Rosing, W. H. V.
Ross, D. C.
Roope, Thos.
Russum, T. H.

Sage, R. V.
Scheffer, F. H.
Schnepel, J. H.
Schroyer, C. A.
Schulze, R. W.
Searles, E. J.
Seddon, C. W.
Seley, C. A.
Selloy, S. H.
Setchel, J. H.
Shackford, J. M.
Sharp, W. E.
Shone, William.
Sitterly, W. H.
Small, H. J.
Small, J. W.
Smith, B. T.
Smith, W. A.
Spoor, C. E.
Squire, W. C.
Stark, F. H.
Stillwagon, G. W.
Stucki, A.
Sumner, Elioc.
Sutherland, T.
Sweringen, F. H.
Symington, T. H.

Tatum, J. J.
Taylor, J. W.
Tewkesbury, E. M.
Thiele, C. F.
Thomas, F. H.
Thomas, H. T.
Thomas, I. B.
Thomas, W. H.
Thompson, W. O.
Thomson, S. G.
Tonge, John.
Trimyer, H. L
Turner, Amos.
Turner, L. H.
Turner, J. S.
Turney, E. E.

Van Brimer, Geo.
Van Buren, C. W.
Vincent, M. M.
Voss, Wm.

Waitt, A. M.
Walsh, F. O.
Walsh, J. F.
Watts, A. H.
Waughop, Charles.
Webster, H. A.
West, G. W.
Westervelt, Joseph.
Whitridge, J. C.
Whyte, F. M.
Wildin, G. W.
Williams, R. B.
Williams, R. H.
Worhle, John.
Wyman, R. R.

Yergy, J. P.
Young, C. B.

THE PRESIDENT: Gentlemen, the next in order are the reports of the Secretary and Treasurer.

The Secretary here read his report.

SECRETARY'S REPORT.

To the President and Members of the Master Car Builders' Association:

GENTLEMEN,— I have the honor to submit herewith detailed statement showing the condition of the organization both as to its membership and finances. These cover the year closing June 1, 1908, the date when the books of the Secretary were closed.

ACTIVE MEMBERS.

Membership, June, 1907		377
Transferred to representative	4	
Dropped, non-payment of dues	4	
Resigned	5	

Deaths	2	
Transferred to life membership	1	
		16
		363
Transferred from representative	4	
New members	56	
Resigned	1	
		61
Total		424

REPRESENTATIVE MEMBERS.

Membership, June, 1907		249
Transferred to active	7	
Dropped account absorption of roads	3	
Dropped account of successors appointed	23	
Dead	3	
		36
		213
New representatives, new roads	18	
New representatives, old roads	40	
Transferred from active	4	
		62
Total		275

ASSOCIATE MEMBERS.

Membership, June; 1907	14
Resigned	1
Total	13

LIFE MEMBERS.

Membership, June, 1907	15
Elected, 1907 convention	1
	16
Deaths	2
Total	14

TOTAL MEMBERSHIP.

Active members	424
Representative members	275
Associate members	13
Life members	14
Total membership	726

The Secretary has been advised of the deaths of Messrs. D. W. Hunter and James Macbeth, active members; Messrs. H. W. Watts, J. T. Kebler and O. Stewart, representative members; and Messrs. M. N. Forney and Robert McKenna, life members.

It is suggested that committees be named to prepare obituaries for incorporation in the report of proceedings.

The number of cars represented in the Association compared with last year is as follows:

June, 1908	2,283,330
June, 1907	2,254,397
Increase	28,933

RECEIPTS.

By dues collected from members	$11,152.00
" sale of Rules of Interchange	1,468.25
" " " Air Brake and Signal Instructions	7.72
" " " Reports of Proceedings	597.52
" " " Rules for Loading Long Materials	372.79
" " " Arbitration Cases	139.89
" " " Lithographs	178.07
" " " Standards	121.68
" " " Blue-prints, lettering	3.50
" Interest on bank balance	50.25
Total receipts	$14,091.67

EXPENSES.

Paid exchange	$ 38.65
" expenses, convention 1907	64.25
" stamps and stamped envelopes	436.82
" office supplies and expenses	128.31
" printing	7,046.14
" telegraph and telephone service	52.37
" expenses, committees	665.33
" express	214.74
" blue-prints, tracings, etc	172.00

Paid salary Secretary, including clerk	3,600.00
" reporting convention 1907	188.30
" zinc cuts, electros, etc	189.75
" office rent	502.91
" lithographs	553.00
" surety bonds, Secretary and Treasurer	36.00
" balance remitted to Treasurer	203.10
Total	$14,091.67

The only unpaid bills are for the printing and preparation of some of the reports which came to hand after the books were closed.

A detailed statement of dues collected from members is attached and forms part of this report.

The amount of unpaid dues is $488. A statement of the members who still owe for dues is attached hereto for the information of the members.

During the year twenty-nine railroads and private car lines have signified their desire to become subscribers to the Rules of Interchange governing freight cars, and their names will appear in the list of subscribers when the revised code is issued:

Arkansas Central R. R.
Arkansas, Louisiana & Gulf Ry.
Barrett Mfg. Co.
Birmingham Southern Ry.
Chicago, Cincinnati & Louisville R. R.
Chicago, Kalamazoo & Saginaw Ry.
Chicago & Milwaukee Electric Ry.
Crystal Car Lines.
Elizabeth River R. R.
Florida Central Ry.
Fort Worth Belt Ry.
W. A. Guyton & Co.
Kilpatrick Bros. & Collins Contracting Co.
Lehigh & New England R. R.
Litchfield & Madison R. R.
Louisiana & Arkansas Ry.
Louisville Soap Co.
Michigan Ammonia Works.
Monongahela River Consolidated Coal & Coke Co.
Morton-Gregson Car Lines.
Norfolk & Portsmouth Belt Ry.
Quebec, Montreal & Southern Ry.
Susquehanna & New York R. R.
Tacoma Eastern Ry.
Tehuantepec National R. R.

Texas Brewing Co.
Tonopah & Tidewater R. R.
Union Refrigerator Transit Co.
Wisconsin & Northern Ry.

Five railroads have also advised of their acceptance of the Code of Rules governing the interchange of passenger equipment:

Boston & Albany.
Central Vermont.
Louisiana & Arkansas.
Pittsburgh & Lake Erie.
Temiskaming & Northern Ontario.

JOSEPH W. TAYLOR,
Secretary.

DETAILED STATEMENT OF DUES COLLECTED.

JUNE 17, 1907, TO JUNE 6, 1908.

1907.			
June	17	G. H. Eaton....$	4.00
"	17	W. H. Pearson.	4.00
"	17	C. F. Rydberg..	4.00
"	17	S. P. Robbins...	4.00
"	17	John Worhle ..	4.00
"	17	J. H. Cowen, Jr.	4.00
"	17	J. C. Persh.....	4.00
"	17	J. F. Diebert....	4.00
"	17	W. H. Hall.....	4.00
"	18	R. S. Miller....	4.00
"	18	T. M. Ramsdell.	4.00
"	19	W. F. Bentley..	4.00
"	19	S. J. Dillon.....	4.00
"	19	Geo. N. Dow...	4.00
"	19	W. F. Gorrell..	4.00
"	18	O. Stewart	16.00
"	19	W. H. Thomas.	4.00
"	18	J. F. Tonry.....	4.00
"	17	F. R. Cooper...	4.00
"	18	W. L. Kellogg..	68.00
"	18	A. L. Kendall..	4.00
"	18	Jas. Marchbanks	8.00
"	18	Geo. Thompson.	4.00
Carried forward		.......$	172.00
Brought forward		......$	172.00
June	18	Jno. Mailer	16.00
"	18	H. Mandeville..	4.00
"	18	D. C. Courtney.	4.00
"	18	C. H. Davis....	4.00
"	18	P. D. Plank....	4.00
"	17	T. Sutherland..	4.00
"	17	D. F. Knapp...	4.00
"	17	R. W. Barrett..	4.00
"	17	J. W. Kelly....	4.00
"	17	B. T. Smith....	4.00
"	17	Andrew Craig..	4.00
"	17	E. B. Miller....	4.00
"	29	N. L. Friese....	4.00
"	29	H. E. Passmore	4.00
"	29	O. A. LaRue...	4.00
"	18	E. S. Bottomly.	4.00
July	5	A. B. Appler...	4.00
"	5	R. H. Soule....	4.00
"	5	J. A. McNaughten	4.00
"	5	H. H. Vaughan.	4.00
"	5	E. M. Herr....	4.00
"	5	W. O. Thompson	4.00
Carried forward		......$	272.00

Brought forward		$	272.00
July	5	J. J. Ewing	4.00
“	5	L. R. Pomeroy	4.00
“	5	M. W. Smith	4.00
“	5	G. W. Lillie	4.00
“	5	H. M. Pflager	4.00
“	5	J. G. Neuffer	4.00
“	5	W. T. Fitzgerald	4.00
“	5	W. S. Morris	4.00
“	5	W. E. Symons	4.00
“	5	R. B. Kendig	4.00
“	5	C. H. Howard	4.00
“	5	J. S. Turner	4.00
“	5	Thos. Aldcorn	4.00
“	5	J. E. Keegan	16.00
“	5	W. H. Nuttall	4.00
“	5	G. M. Gray	4.00
“	5	F. T. Casanave	4.00
“	5	P. H. Peck	4.00
“	5	Wm. O'Herin	4.00
“	5	W. F. M. Goss	4.00
“	5	A. M. Waitt	4.00
“	5	S. P. Bush	4.00
“	5	Robt. Quayle	4.00
“	5	F. H. Thomas	4.00
“	5	J. K. Brown	4.00
“	5	J. H. Martin	4.00
“	5	Jos. Buker	4.00
“	5	S. F. Prince, Jr.	4.00
“	5	Ira Everett	4.00
“	5	C. H. Quereau	4.00
“	5	M. D. Greene	4.00
“	5	T. Dunbar	4.00
“	5	G. J. Davis	4.00
“	5	H. W. Watts	4.00
“	5	Geo. I. King	4.00
“	5	Angus Sinclair	4.00
“	5	G. E. Carson	4.00
“	5	A. R. McAlpine	8.00
“	5	D. L. Phipps	4.00
“	5	S. H. Blewett	4.00
“	5	E. R. Slagle	4.00
“	5	Chas. Waughop	4.00
“	5	W. D. Lowry	4.00
Carried forward		$	460.00

Brought forward		$	460.00
July	5	W. H. V. Rosing	4.00
“	5	M. A. Kimmett	4.00
“	5	R. H. Williams	8.00
“	5	G. W. Wildin	4.00
“	5	H. Coulter	4.00
“	5	E. A. Benson	4.00
“	5	Chas. Lindstrom	4.00
“	5	A. Stucki	4.00
“	5	Wm. Voss	4.00
“	5	Elliott Sumner	4.00
“	5	H. A. Bowen	4.00
“	5	P. M. Egan	4.00
“	5	H. Carlton	4.00
“	5	W. E. Rockefellow	4.00
“	5	J. C. Whitridge	4.00
“	5	R. F. McKenna	4.00
“	5	L. D. Roberts	4.00
“	5	J. F. Divine	4.00
“	5	R. H. Williams	12.00
“	5	T. A. Edmondson	4.00
“	5	J. M. Elliott	4.00
“	6	J. W. Addis	4.00
“	27	W. C. Squire	4.00
“	27	S. H. Selloy	4.00
“	27	S. K. Dickinson	8.00
“	27	R. D. Smith	4.00
“	27	W. H. Marshall	4.00
“	27	W. C. Ennis	4.00
“	27	T. A. Lawes	4.00
“	27	T. A. Keyworth	4.00
“	27	J. L. Greatsinger	4.00
“	27	Jno. Mackenzie	4.00
“	27	F. B. Lockhart	8.00
“	27	Geo. Gibbs	4.00
“	27	Raymond DuPuy	8.00
“	27	D. VanAlstyne	4.00
“	27	W. W. Atterbury	4.00
“	27	R. L. Ettenger	4.00
“	27	H. Monkhouse	4.00
“	27	F. M. Whyte	4.00
Carried forward		$	644.00

		Brought forward ......$	644.00
July	27	F. M. Gilbert...	4.00
“	27	J. K. Brassill...	4.00
“	27	J. H. Clark....	4.00
“	27	A. E. Mitchell..	4.00
“	27	W. N. Best....	4.00
“	27	H. M. Carson..	4.00
“	27	C. A. Seley.....	4.00
“	27	F. H. Scheffer..	40.00
“	27	J. N. Mowery..	4.00
“	27	W. C. Burel....	4.00
“	27	A. W. Quackenbush	4.00
“	27	J. E. Gould.....	12.00
“	27	J. F. Walsh....	148.00
“	27	Rodney Hitt ...	4.00
“	27	Max Goodrich .	4.00
“	27	L. G. Parish....	236.00
“	27	Jno. Cullinan...	4.00
“	27	A. Allan	4.00
“	27	A. Shields	28.00
“	27	H. S. Bryan....	24.00
“	27	G. C. Bishop...	12.00
“	27	H. R. Payne....	40.00
“	27	W. H. Miner...	4.00
“	27	Frank Singer ..	4.00
“	27	E. O. Smith....	4.00
“	27	Wm. McIntosh.	96.00
“	27	R. F. Kilpatrick	112.00
“	27	T. H. Abrams..	4.00
“	27	J. J. Ryan......	60.00
“	27	J. R. Cade......	4.00
“	27	David Grattan .	4.00
“	27	J. W. Murray..	4.00
“	27	F. C. Cleaver...	12.00
“	27	C. H. Bowers..	4.00
“	27	S. W. Combs...	4.00
“	27	R. K. Reading..	56.00
“	27	C. L. McIlvaine.	4.00
“	27	W. H. Sitterly..	4.00
“	27	J. M. James....	4.00
“	27	R. C. Pew......	4.00
“	27	G. M. Ferguson.	4.00
“	27	F. H. Stark....	16.00
		Carried forward ......$	1,648.00

		Brought forward ......$	1,648.00
July	27	S. S. Stiffey....	108.00
“	27	T. M. Feeley...	16.00
“	27	E. DeSilva.....	4.00
“	27	R. M. Galbraith	36.00
“	27	G. T. Glover....	4.00
“	27	H. J. Small....	136.00
“	27	H. L. Millis....	8.00
“	27	W. F. Kapp....	4.00
“	27	A. L. Humphrey	4.00
“	27	Tabor Hamilton	4.00
“	27	Jno. Leaman ...	4.00
“	27	Thos. Paxton ..	12.00
“	27	T. A. Brown...	4.00
“	27	Peter Kirk	16.00
“	27	O. W. Lewis...	4.00
“	27	F. O. Walsh....	8.00
“	27	Wm. Garstang..	116.00
“	27	W. P. Raidler..	4.00
“	27	B. Reiley	4.00
“	27	F. E. Davisson.	12.00
“	27	John Tonge	20.00
“	27	J. B. Shelton...	8.00
“	27	F. H. Eddy....	4.00
“	27	J. E. Chisholm.	48.00
“	27	Ira Scofield	4.00
“	27	W. J. Shreeve..	4.00
“	27	G. A. Hancock.	120.00
“	27	Wm. Youlds ...	4.00
“	27	Jas. Buker	12.00
“	27	F. H. Clark....	4.00
“	27	F. A. Torrey...	128.00
“	27	F. H. Sweringen	36.00
“	27	J. McE. Ames..	4.00
“	27	J. P. Yergy.....	4.00
“	27	Jos. Westervelt.	4.00
“	27	J. P. Young....	4.00
“	27	E. E. S. Keith..	4.00
“	27	A. L. Morgan..	4.00
“	27	F. F. Gaines....	44.00
“	27	M. L. Diaz.....	4.00
“	27	W. D. Minton..	4.00
“	27	A. R. Fay......	4.00
“	27	F. H. Eaton....	4.00
		Carried forward ......$	2,632.00

Brought forward		......	$ 2,632.00
July	27	O. F. Zeug.....	4.00
"	27	J. M. Murdock.	4.00
"	27	R. E. Smith....	96.00
"	27	G. L. Fowler...	4.00
"	27	P. M. Hammett	36.00
"	27	F. T. Hyndman.	92.00
"	27	Jno. Hair	44.00
"	27	J. C. Ramsey...	4.00
"	27	H. S. Hills.....	4.00
"	27	D. F. Crawford.	4.00
"	27	W. C. A. Henry	96.00
"	27	R. P. C. Sanderson	52.00
"	27	Mart Campbell.	8.00
"	27	H. S. Hayward.	44.00
"	27	A. W. Gibbs....	4.00
"	27	H. P. Meredith.	4.00
"	27	R. L. Kleine....	4.00
"	27	A. S. Vogt.....	4.00
"	27	W. F. Kiesel...	4.00
"	27	E. D. Nelson...	4.00
"	27	E. F. Chaffee...	4.00
"	27	W. G. Menzel..	36.00
"	27	J. F. Wallis....	44.00
"	27	T. H. Russum..	312.00
"	27	H. Weitzel	4.00
"	27	Thos. Roope ...	64.00
"	27	E. A. Gilbert...	4.00
"	27	W. H. Goehrs..	4.00
"	27	W. U. Benedict.	4.00
"	27	G. C. Jewell....	4.00
"	27	J. W. Records..	4.00
"	27	A. C. Hinckley.	56.00
"	27	L. B. Rhodes...	16.00
"	27	J. L. Hodgson..	4.00
"	27	H. F. Ball......	4.00
"	27	Jas. Milliken...	44.00
"	27	W. H. Lungren.	4.00
"	27	Wm. Renshaw..	264.00
"	27	Chas. Coller ...	28.00
"	27	C. W. Seddon..	32.00
"	27	A. Stewart	236.00
"	27	F. R. McFeatters	8.00
Carried forward		......	$ 4,328.00

Brought forward		......	$ 4,328.00
July	27	W. B. Hall.....	12.00
"	27	A. C. Mather...	4.00
"	27	O. M. Stimson.	36.00
"	27	J. S. Cook.....	8.00
"	27	G. R. Joughins.	48.00
"	27	T. Rumney	248.00
"	27	Samuel King ..	4.00
"	27	S. A. Crone....	4.00
"	27	J. G. Rodgers..	4.00
"	27	T. A. Foque....	56.00
"	27	W. A. Mitchell.	4.00
"	27	S. T. Park.....	80.00
"	27	T. S. Lloyd....	200.00
"	27	J. C. Barber....	4.00
"	27	H. C. Ostermann	4.00
"	27	A. G. Field.....	4.00
"	27	G. W. Stillwagon	4.00
"	27	R. A. Billingham	16.00
"	27	W. H. Wilson..	56.00
"	27	Wm. Mills	4.00
"	27	Thos. Colgate..	8.00
"	27	E. T. Millar....	4.00
"	27	J. H. Gano.....	4.00
"	27	F. W. Chaffee..	4.00
"	27	S. Higgins	4.00
"	27	D. C. Ross.....	4.00
"	27	Wm. Kells	4.00
"	27	T. E. Parker...	4.00
"	27	J. A. McNaughten	4.00
"	27	W. E. Sharp....	60.00
"	27	J. E. Simons...	4.00
"	27	Nathaniel Curry	4.00
"	27	H. A. Beaumont	4.00
"	27	J. T. Taylor....	4.00
"	27	C. H. Cory.....	4.00
"	27	A. E. Manchester	4.00
"	27	A. C. Hayes....	4.00
"	27	P. Scully	4.00
"	27	Otis Mouser ...	4.00
"	27	W. L. Garland..	4.00
"	27	A. M. Kittredge	4.00
"	27	C. H. Dickerman	4.00
Carried forward		......	$ 5,276.00

		Brought forward	$ 5,276.00
July	27	R. T. Shea.....	4.00
"	27	A. B. Corinth..	8.00
"	27	H. C. McCarty.	4.00
"	27	L. H. Turner...	76.00
"	27	F. E. Canda....	4.00
"	27	J. T. Keithley..	4.00
"	27	Wm. Alter	4.00
"	27	E. W. Grieves..	4.00
"	27	T. H. Symington	4.00
"	27	Amos Turner ..	4.00
"	27	S. B. Thomas..	4.00
"	27	R. H. Parks....	4.00
"	27	J. T. Magill....	4.00
"	27	Henderson Weir	4.00
"	27	C. Setzekorn ..	16.00
"	27	J. F. Kehrman..	8.00
"	27	John Doyle	4.00
"	27	S. F. Miller....	4.00
"	27	E. Fisher	4.00
"	27	G. H. Hopkins..	4.00
"	27	P. T. Mooney..	4.00
"	27	John Horrigan..	37.35
"	27	A. L. Rossiter..	12.00
Aug.	5	Ed. Stoudt	4.00
"	7	C. N. Gage.....	12.00
"	7	H. Bartlett.....	4.00
"	7	J. R. Onderdonk	4.00
"	7	E. S. Marshall.	4.00
"	7	J. J. Hennessey.	192.00
"	7	W. E. Dunham.	4.00
"	7	E. W. Burgiss..	4.00
"	7	W. Worsdell ...	4.00
"	7	H. L. Trimyer..	4.00
"	7	J. A. Carney....	4.00
"	7	C. J. Thornton.	4.00
"	7	G. R. Henderson	4.00
"	7	J. A. McRae...	4.00
"	7	C. P. Converse.	4.00
"	7	A. H. Watts...	8.00
"	7	E. D. Bronner..	96.00
"	7	J. E. Bradley...	4.00
"	7	J. W. Fogg.....	4.00
"	7	C. N. Mendenhall	4.00
		Carried forward	$ 5,873.35

		Brought forward	$ 5,873.35
Aug.	7	J. P. McCuen..	72.00
"	7	R. E. McCuen..	4.00
"	7	J. J. Waters....	12.00
"	7	T. E. Adams...	44.00
"	7	W. R. McKeen, Jr.	72.00
"	7	W. L. Kellogg..	68.00
"	7	J. J. Tatum....	4.00
"	7	T. B. Purves, Jr.	60.00
"	7	H. N. Perry....	4.00
"	7	G. W. Smith...	100.00
"	7	W. H. Richmond	8.00
"	7	Geo. T. Rohrback	4.00
"	7	J. S. Lentz.....	172.00
"	7	F. T. Slayton...	8.00
"	7	G. S. McKee...	20.00
"	7	J. H. Manning..	72.00
"	7	Wm. Moir	164.00
"	7	S. A. Charpiot..	4.00
"	7	M. J. Schneider.	24.00
"	7	J. E. Irvin.....	4.00
"	7	A. Lovell	212.00
"	7	D. O'Leary	4.00
"	7	W. A. Smith...	4.00
"	7	J. J. Sullivan...	4.00
"	7	H. Schlacks ...	4.00
"	7	L. A. Shepard..	4.00
"	7	W. J. Haynen..	4.00
"	7	J. W. Small....	4.00
"	7	J. S. Stringham.	4.00
"	7	B. R. Brandow.	4.00
"	7	R. D. Williams.	4.00
"	7	J. C. Wilder...	8.00
"	7	G. W. West....	32.00
"	7	S. G. Thompson	4.00
"	7	T. A. Treleaven	4.00
"	7	E. M. Tewkesbury	4.00
"	10	O. B. Englisch.	4.00
"	10	W. C. Arp......	36.00
"	10	J. G. Mayne....	4.00
"	10	R. W. Burnett..	4.00
		Carried forward	$ 7,145.35

Brought forward			$ 7,145.35
Aug.	10	Frank Howard	4.00
"	10	J. B. Barnes	96.00
"	10	G. W. Dixon	4.00
"	10	J. J. Conolly	16.00
"	10	H. D. Taylor	192.00
"	10	J. P. Maloney	4.00
"	10	C. S. Shearman	4.00
"	10	Geo. Van Brimer	4.00
"	10	J. E. Cameron	4.00
"	10	Jno. Horrigan	18.65
"	10	M. W. Fitzgerald	8.00
"	10	E. B. Gilbert	40.00
"	10	J. F. Graham	20.00
"	10	A. J. Cota	4.00
"	10	C. M. Burcher	4.00
"	27	Thos. Millen	4.00
"	27	P. D. Park	12.00
"	27	W. O. Johnson	12.00
"	27	F. P. Pfahler	4.00
"	27	H. Hube	4.00
"	27	S. B. Grimshaw	4.00
"	27	Geo. Thompson	4.00
"	26	K. W. Blackwell	4.00
"	26	G. W. French	4.00
"	26	Wm. McWood	132.00
"	26	G. F. Deckleman	4.00
"	26	R. N. Dodge	4.00
"	26	T. W. Demarest	216.00
"	26	S. K. Dunkle	4.00
"	26	R. N. Durborow	468.00
"	26	W. B. Ott	4.00
"	26	W. F. Eberly	4.00
"	26	R. W. Geesey	4.00
"	26	C. O. Keagy	4.00
"	26	J. C. Mengel	4.00
"	26	S. M. Hindman	4.00
"	26	Wm. Elmer, Jr.	4.00
"	26	J. F. Courson	4.00
"	26	Ben Johnson	48.00
"	26	L. S. Kinnaird	12.00
"	26	C. B. Young	4.00
"	26	P. G. Smith	4.00
"	26	J. A. Hughes	4.00
Carried forward			$ 8,552.00

Brought forward			$ 8,552.00
Aug.	26	Wm. Moir	4.00
"	26	G. H. Bussing	28.00
"	26	W. G. McCullough	4.00
"	26	F. H. Neward	4.00
"	26	H. C. Van Buskirk	32.00
"	26	G. T. Anderson	4.00
"	26	P. G. Maguire	4.00
"	26	F. Tanaka	4.00
"	26	Jno. Mailer	8.00
"	26	Robt. Mitchell	8.00
"	26	E. W. Mead	4.00
"	26	G. S. McKee	44.00
"	26	Chas. Stretzinger	4.00
"	26	L. T. Nichols	4.00
"	26	D. White	4.00
"	26	C. E. Fuller	48.00
"	26	Edw. Deacon	4.00
"	26	C. J. Stewart	4.00
"	26	V. P. Safford	4.00
"	26	G. S. Hunter	16.00
Sept.	12	G. Nagahashi	4.00
"	25	C. S. Morse	64.00
"	25	R. V. Wright	4.00
"	25	J. J. Casey	4.00
"	25	I. S. Downing	4.00
"	25	J. A. McConnell	4.00
"	25	H. LaRue	4.00
"	25	P. D. Plank	4.00
"	25	W. H. Lewis	172.00
"	25	A. Kearney	4.00
"	25	W. W. McFarland	4.00
"	25	F. W. Brazier	344.00
"	25	Wm. Miller	28.00
"	25	I. C. Hubbell	12.00
"	25	Jas. Coleman	20.00
"	25	C. Phillips	4.00
"	25	R. L. Gordon	4.00
"	25	A. Bardsley	8.00
"	25	L. W. Berry	8.00
"	25	J. W. Muncy	52.00
Carried forward			$ 9,540.00

Brought forward ......$ 9,540.00

Sept.	25	J. P. Dolan.....	4.00
"	25	T. R. McLeod..	4.00
"	25	J. W. Marden..	108.00
"	25	Jno. Pitt	8.00
"	25	W. G. Wallace..	40.00
"	25	P. Maher	16.00
"	25	M. W. Fitzgerald	4.00
"	25	C. D. Pettis....	4.00
"	25	C. A. Schroyer.	240.00
"	25	H. H. Griffiths..	4.00
"	25	S. Millican	4.00
"	25	G. A. Gallagher.	28.00
"	25	W. E. Fowler...	204.00
"	25	E. A. Miller....	44.00
Oct.	9	T. P. Seifert...	8.00
"	9	M. R. Coutant..	4.00
"	9	C. E. Spoor....	16.00
"	9	F. W. Dickinson	4.00
"	9	J. W. Fleming..	4.00
"	9	H. T. Thomas..	4.00
"	9	Wm. Forsyth ..	4.00
"	9	A. J. Fries.....	4.00
"	9	H. P. Latta....	4.00
Oct.	15	Wm. Shone	4.00
"	18	J. S. Chambers.	4.00
"	18	T. H. Curtis....	156.00
"	18	Wells Harris ...	4.00
"	18	Wm. Miller	4.00
"	18	R. F. Blackwell.	4.00
"	18	T. S. Beauclerk.	4.00
"	18	Harry Pearse ..	4.00
"	18	L. Greaven	8.00
"	30	J. B. Michael...	4.00
Nov.	23	J. J. Anderson..	12.00
"	23	M. M. Vincent..	16.00
"	23	L. L. Tyler.....	4.00
"	23	W. E. Knight...	4.00
"	23	R. H. Johnson..	4.00
"	23	M. J. Drury....	4.00
"	23	Geo. S. Shafer..	4.00
Dec.	21	J. F. Deems....	4.00
"	21	Wm. Percy	4.00
"	21	B. P. Flory.....	4.00

Carried forward $10,560.00

Brought forward $10,560.00

1908.

Jan.	1	J. C. Rigby.....	4.00
"	6	R. L. Wyman...	4.00
"	6	W. K. Carr.....	4.00
"	21	A. La Mar.....	4.00
"	21	W. W. Todd...	4.00
"	21	C. F. Thiele....	4.00
"	21	Chas. Streicher.	4.00
"	21	F. L. Bachelor..	4.00
"	21	R. W. Schulze..	4.00
"	21	C. H. Hartley..	4.00
Feb.	3	F. B. Smith....	4.00
"	11	T. S. Beauclerk.	4.00
"	11	Harry Pearse ..	4.00
"	11	F. H. Niles.....	4.00
"	11	J. A. Pilcher....	4.00
"	11	C. N. Littell....	8.00
"	11	B. D. Lockwood	8.00
"	13	W. A. Nettleton	4.00
Mar.	11	T. Nicholson ...	4.00
"	11	W. J. Robider..	4.00
"	11	A. D. Smith....	4.00
"	11	S. W. Miller...	4.00
"	11	J. Christopher..	4.00
"	11	Henry Close ...	4.00
"	11	E. H. Conrades.	4.00
"	11	W. J. Wilcox...	8.00
"	11	Samuel Porcher	4.00
"	11	J. S. Patterson.	4.00
"	11	W. Augustus ...	4.00
"	11	J. B. Yohe......	4.00
"	11	E. J. Searles....	4.00
"	11	F. L. Fox......	4.00
"	11	W. J. Davis....	4.00
"	11	J. H. Setchel...	4.00
"	11	Geo. Rommel ..	4.00
"	11	J. M. Shackford	4.00
"	11	A. C. Deverell..	4.00
"	11	M. K. Barnum..	4.00
"	11	Wm. Hamilton.	4.00
"	11	Jas. Clark	4.00
"	11	Robt. Gunn	12.00
"	11	Max Epstein ...	12.00

Carried forward $10,756.00

Brought forward			$10,756.00
Mar.	11	Wm. Hassman .	4.00
"	11	F. N. Hibbits...	4.00
"	11	H. W. Hibbard.	4.00
"	21	C. J. McMasters	4.00
"	21	D. B. Middagh.	4.00
"	21	C. H. Prescott..	4.00
"	21	Jno. Eckhart, Jr.	4.00
"	21	R. T. Earle.....	4.00
"	21	W. G. Collar...	4.00
"	21	J. F. Dunn.....	36.00
"	21	W. B. Blanton..	4.00
"	21	J. T. Fite.......	4.00
"	21	J. F. Moore....	4.00
Apr.	17	H. L. Lewis.....	4.00
"	17	H. P. Dunham..	4.00
"	17	C. M. Bloxham.	4.00
"	17	W. Hale	4.00
"	17	S. T. Case......	4.00
"	17	J. Gauthier	4.00
"	17	H. C. Bossinger	4.00
"	17	W. A. Love.....	4.00
"	17	T. McDonnell ..	4.00
"	27	R. Hill	4.00
"	17	C. M. Stansbury	4.00
"	17	E. N. Weist....	4.00
Carried forward			$10,888.00

Brought forward			$10,888.00
Apr.	17	D. W. Cunningham	4.00
"	18	P. H. Cosgrove.	8.00
"	23	J. F. DeVoy....	4.00
"	23	J. F. Hartung..	4.00
"	23	G. H. Emerson.	160.00
May	1	T. N. Kucher...	8.00
"	5	F. W. Taylor...	4.00
"	12	C. W. Murphy..	4.00
"	12	F. B. Stigger...	4.00
"	12	F. S. Kent......	4.00
"	12	C. E. Pfeiffer..	4.00
"	23	John Hartung .	4.00
"	23	H. N. Demarest	8.00
"	23	C. H. Rockwell.	4.00
"	23	W. T. Foster...	4.00
"	23	W. R. Duff.....	4.00
"	30	T. W. Adams...	4.00
"	30	T. F. Brady....	4.00
June	6	Robt. Gould ...	4.00
"	6	Jno. Diebert ...	4.00
"	6	E. Chamberlain.	4.00
"	6	F. C. York.....	8.00
"	6	H. Mandeville .	4.00
Total		....	$11,152.00

TREASURER'S STATEMENT.

To the Members:

Balance on hand May 31, 1907......................	$6,640.69
Received from Secretary, June 12, 1908..............	203.10
Interest on bank balance, May 31, 1908...............	112.21
	$6,956.00

Your Treasurer has drawn on the funds of the Association, on account of the Brake Shoe Committee, in favor of Purdue University, to the amount of $345.56, but as the checks have not been returned through the bank they are omitted from this report, and will appear in the report for next year.

JOHN KIRBY,
Treasurer.

MR. J. J. HENNESSEY: I move that the reports be received and referred to the Auditing Committee.

Motion seconded and carried.

THE SECRETARY: At a meeting of the Executive Committee last evening it was decided to recommend that the annual dues for the coming year remain the same as heretofore — $4 per vote. A motion to confirm that would be in order.

MR. HENNESSEY: I move that the action of the Executive Committee be approved.

Motion seconded and carried.

THE PRESIDENT: Nominations will be in order for an Auditing Committee of three members. The nominations should be made from the floor of the convention.

The following gentlemen were nominated: Mr. Eugene Chamberlin, Mr. H. L. Trimyer, Mr. J. W. Fogg.

MR. PECK: I move that the nominations be confirmed.

Motion seconded and carried.

THE SECRETARY: I would like to say to the gentlemen of the Auditing Committee that they will find the books of the Secretary and Treasurer on the desk here whenever they wish to make the audit.

THE PRESIDENT: I would name the following committees:

Nominations: Messrs. John S. Lentz, F. W. Brazier, Joseph E. Buker, H. D. Taylor, W. A. Nettleton.

Resolutions: Messrs. J. F. Walsh, F. H. Turner, G. W. Wilden.

Obituaries: Mr. G. W. Wilden, on D. W. Hunter; Mr. F. W. Brazier, on James Macbeth; Mr. L. H. Turner, on H. W. Watts; Mr. T. B. Purves, on J. T. Kebler; Mr. P. M. Hammett, on O. Stewart; Mr. T. S. Lloyd, on Robert McKenna; Mr. Angus Sinclair, on M, N. Forney.

THE PRESIDENT: The next business to come before the meeting is Unfinished Business.

THE SECRETARY: Mr. President, there is no unfinished business.

THE PRESIDENT: The next to come before the meeting is New Business.

THE SECRETARY: Mr. President, as you all know, we have a good deal of testing apparatus at Purdue University, Lafayette, Indiana, and you also know that Dean W. F. M. Goss has left there to go to the University of Illinois, Urbana, Illinois. Prof. Charles H. Benjamin, his successor at Purdue University, is here, and I would like to ask that Dean Goss introduce Professor Benjamin to the members of the Association. [Applause.]

Prof. W. F. M. Goss: Mr. President and Gentlemen of the Association: It has now been sixteen years since I first came as a visitor to the convention of the Master Car Builders' Association. I came and until now have worked with you year by year as a representative of Purdue University. The university has found in the relation thus sustained much which has been stimulating and helpful to it. The Association, on the other hand, has from time to time seen fit to make use of it in advancing its scientific interests. Gradually there has been built up at Purdue, through the unanimous support of the members of this Association, a Master Car Builders' laboratory which now embraces three important installations of machinery, namely, the drop testing machine, the air brake testing rack and the brake shoe testing machine. I shall not attempt to tell you how much pleasure it has been to me to have had a part in the upbuilding of this laboratory, but I can frankly say that one of the sources of regret that I have had to face in leaving Purdue University to accept responsibility elsewhere has been found in the fact that by so doing I must relinquish certain relations which I have sustained toward this Association. This feeling of regret, which is deep and sincere, is, however, greatly modified by the fact that the man who has been chosen to succeed me at Purdue is one most worthy to discharge the responsibilities which he has assumed. Born in the great State of Maine, a graduate of Orono College, for two decades the professor of Mechanical Engineering of the Case School of Applied Science in Cleveland, a recipient from that institution of the degree of Doctor of Engineering, and the possessor of a well-merited reputation as an engineer, he was last August made the Dean of the Schools of Engineering of Purdue University and by virtue of this appointment he became the ex-officio custodian of the Master Car Builders' laboratory. These statements, all too brief, will indicate the source of pleasure I feel in being permitted formally to introduce Professor Benjamin to the convention.

Finally, on behalf of the convention, permit me to say to

Professor Benjamin that every member of this Association can be depended upon to extend to him the same cordial and unfailing support which they have always given me. Mr. President and Gentlemen, I present to you Dr. Charles H. Benjamin. [Applause.]

PROF. C. H. BENJAMIN: Mr. President and Gentlemen of the Master Car Builders' Association: It is with much pleasure that I come to the first meeting of your Association. I realize very deeply the responsibility which I have incurred, especially toward the railroad men, in undertaking the work which Dean Goss has carried on successfully for so many years, and I feel that this is not the time nor the place for me to make promises.

I simply want to tell you that I am taking up this work with a great deal of enthusiasm, with much courage, and with all due modesty, but that I can not hope to become a full-fledged railroad engineer on so short a notice. I am willing to learn, and I trust I shall be able to serve you in such a way that you will not regret too much the fact that Dean Goss has left the position I now occupy. I thank you. [Applause.]

THE PRESIDENT: We have with us this morning the Secretary of the Interstate Commerce Commission. I think all the members will be much interested in hearing from him. I have the honor of introducing to you Mr. E. A. Moseley, Secretary of the Interstate Commerce Commission.

MR. E. A. MOSELEY (Secretary, Interstate Commerce Commission): Mr. President, Members of the Master Car Builders' Association: Since the last meeting of your Association the Employer's Liability Law of June 11, 1906, to which I called attention in my remarks last year, has been declared unconstitutional by a bare majority of the Supreme Court. That legislation of this character is deemed necessary, however, is shown by the fact that Congress has enacted a more drastic statute, confining its operation to the field of commerce subject to Federal regulation. The present law provides that if any employee of a carrier by railroad shall become injured while engaged in interstate commerce, because of a violation by the carrier of any statute enacted for the safety of employees, the fact that the injured employee may have been guilty of contributory negligence shall not relieve the carrier from liability; nor does the injured employee assume the risk occasioned by the carrier's violation of such a law. Neither may carriers subject to the statute exempt themselves from the liabilities created by the law by means of any contract or rule. The law therefore greatly increases the financial responsibility of interstate carriers to their employees, and makes it necessary for them to exercise the greatest care in the employment of men, as well as to keep all equipment in proper repair.

An important decision handed down by the Supreme Court of the United States one month ago in the case of St. Louis Iron Mountain & Southern Railway Company vs. May Taylor will be of interest to you. The original Safety Appliance Act of March 2, 1893, authorized the American Railway Association to designate the standard height of drawbars for freight cars to the Interstate Commerce Commission, and this designation became effective after being certified to the Commission and notice of same having been given by the Commission. The standard was fixed at 34½ inches for standard gauge cars, with a maximum variation of 3 inches between loaded and empty cars. This portion of the statute is apparently a delegation of legislative power, and ever since it became effective doubt of its constitutionality has been expressed. This doubt has been removed by the decision referred to; and the court, speaking through Mr. Justice Moody, further holds that the maximum variation of 3 inches between loaded and empty cars is downward from 34½ inches, so that drawbars on standard gauge freight cars must not be higher than 34½ inches nor lower than 31½ inches to comply with law.

Another principle of fundamental importance to the members of this Association was announced by the Court in delivering its opinion in the Taylor case. The Court determined that the exercise of reasonable care to keep equipment up to the standard required by the safety appliance law is no defense in an action for damages for personal injury to an employee, when such injury is caused by violation of the statute. In unmistakable language it was held that the statute imposes upon common carriers by railroad the absolute duty of keeping their equipment in the condition required by law at all times. I quote from the opinion of the court as follows:

> The Congress, not satisfied with the common-law duty and its resulting liability, has prescribed and defined the duty by statute. We have nothing to do but to ascertain and declare the meaning of a few simple words in which the duty is described. It is enacted that "no cars, either loaded or unloaded, shall be used in interstate traffic which do not comply with the standard." There is no escape from the meaning of these words. Explanation can not clarify them, and ought not to be employed to confuse them or lessen their significance. The obvious purpose of the Legislature was to supplant the qualified duty of the common law with an absolute duty deemed by it more just. If the railroad does, in point of fact, use cars which do not comply with the standard, it violates the plain prohibitions of the law, and there arises from that violation the liability to make compensation to one who is injured by it.

Further on in the opinion we find expression of the following humane doctrine:

> Where an injury happens through the absence of a safe drawbar there must be hardship. Such an injury must be an irreparable misfortune to some one. If it must be borne entirely by him who suffers it, that is a hardship to him. If its burden is transferred, as far as it is capable of transfer, to the employer, it is a hardship to him. It is quite conceivable that Congress, contemplating the inevitable hardship of such injuries, and hoping to diminish the economic loss to the community resulting from them, should deem it wise to impose their burdens upon those who could measurably control their causes, instead of upon those who are in the main helpless in that regard.

At your last convention I called attention to the fact that in many cases carriers have paid hundreds of dollars in fines for violation of the Safety Appliance Acts where repairs necessary to avoid the penalty would have cost but a few cents. The penalty prescribed for violation of the Safety Appliance Law is merely nominal, but it is obvious that the financial burden that may be imposed upon carriers in damage suits where failure to keep equipment in repair is the cause of injury to employees may amount to many thousands of dollars. Intelligent self-interest, therefore, demands that carriers subject to the act shall keep their equipment in the highest possible state of efficiency.

The standards of your Association are not trivial matters which may or may not be conformed to at the pleasure of individual members. Legislation is now pending before Congress which aims to make your standards for the protection of trainmen the law of the land. It is true that the bill covering this subject failed of passage at the recent session, but it is sure to come up again, and it is hoped that after you and other friends of such legislation have had ample opportunity for consideration and discussion Congress will enact a law of the character mentioned. If it is the practice to depart from the standards which have been approved and established by this Association the enactment of such a law will necessarily involve many changes which would be obviated by a close adherence to standards. Each of you, as the Master Car Builder of your road, should take the most painstaking care to see that every car owned, used or handled by your road complies with the M. C. B. standards in all particulars. A car used to-day by a road in Maine may be handled next week by an employee of a road in Illinois. In the darkest hour of the night that employee's life may depend upon finding the grabiron, ladder, or other safety appliance in the same location upon every car, and it is not too much to expect that the standards you have adopted or may adopt shall become as binding as any statute enacted by Congress. That Congress is well disposed toward legislation of this character is well illustrated by the course of the so-called "ash-pan bill." That measure was passed by the House of Representatives under suspension of the rules and by unanimous vote, without having been reported from the committee to which it has been referred. The bill then went to the Senate, where it met no opposition. The law will become effective January 1, 1910. Although this law more particularly affects the Master Mechanics of American railroads, it is nevertheless of interest to you as tending to indicate the trend of Congressional action.

Each of you may justly feel proud of the history of this Association and the record of the Master Car Builders of the United States. Uniformity of equipment, to which you have dedicated your work and devoted your earnest and successful efforts, is the most important, the most essential feature in railroad equipment, and whatever legislation the future may bring forth will be a legal recognition of what you yourselves have already accomplished.

I regret to say that the necessity of prosecutions for violation of the Safety Appliance Law still continues. As evidence that suits have been properly brought, and in a spirit of fairness, I will say that prosecutions involving 2,260 violations have been filed in court. Of this number 1,041 cases have been disposed of by trial, confession of judgment, and compromise, and penalties have been collected to the amount of $80,200. Twelve cases have been dismissed by the Government, and in 1,207 cases trial is pending. In but ten cases have decisions unfavorable to the Government been rendered. Most of these cases have been appealed, and it is thought probable that in the higher courts the Government's contention may be sustained. This record of law enforcement, it is believed, can not be equaled. Great progress has been made by carriers during the past year or two, and the general condition of equipment throughout the country shows such marked improvement that we believe the time is near when these appliances will be kept in the highest possible condition of repair and the necessity for prosecutions will be largely eliminated.

Gentlemen, great responsibility rests upon you in the performance of your duties. From deductions based upon reports made to the Commission I find that every two hours and fourteen minutes a railroad employee is killed, and one is injured more or less seriously every seven minutes with the regularity of clockwork. During the few minutes that I am speaking here to-day at least two employees have been injured, and between the time this convention was called to order this morning and its adjournment this afternoon it is certain that two railroad employees will have given up their lives. This one fact will impress upon you in the most emphatic manner your solemn responsibility to railroad employees and the public. Under the beneficent provisions of the Safety Appliance Law, and as a result of your intelligent efforts as Master Car Builders, the number of trainmen killed and injured in coupling and uncoupling cars has decreased each year since the passage of the law, from 1 for every 20 employed to 1 for every 73 employed. For this gratifying result you should receive your full share of credit. If the railway owners of the country would place in your hands the power to determine the amount of money to be expended on equipment, I assert with confidence that the condition of equipment would be far better than it is under the present system. It is true that your properties must be managed with a view to economy, but that economy is ill advised that permits cars and engines to be operated in an unsafe condition.

This is the seventh consecutive convention of your Association I have been privileged to attend. At no gathering of railroad men do I obtain more valuable information nor derive greater pleasure. I believe your members have confidence in me, and for you I entertain the highest regard and respect. We are coworkers to the same end — safety upon American railroads. The chief aim and purpose of the inspectors employed by the Commission under the Safety Appliance Law is safety for employees and travelers upon railways, not prosecution of the railroads. Their most earnest desire, and mine, is to lessen the risks incident to railway employment and reduce the number of casualties to employees and the public. Indirectly, the Federal inspection service also conserves the revenues of the railroads by diminishing the damages resulting from personal injury suits.

The Commission's inspectors come from the ranks. They enjoy the confidence of railroad employees, and while commingling with them at the lodge and meeting rooms of their brotherhood organizations, which are freely open to them, they urge upon employees care and discretion in the performance of their duties. These inspectors know from experience the dangers attending the work of train service employees on railroads; they know the results of taking chances and continually seek to impress employees with a proper regard for the lives and limbs of themselves and their fellows in the service. It is a source of much satisfaction to know that the number of deaths and injuries due to taking risks which are on the border line of recklessness is constantly diminishing, and I attribute much of this to the conscientious efforts of these inspectors in behalf of their former co-employees in yards, upon trains, and in meeting and lodge rooms.

In this progressive age the loss of life and limb upon railroads is appalling. It is a matter of most vital concern to all railway interests. During the past few years Congress has given serious consideration to many bills, the express object of which was to promote safety upon railroads, and some stringent legislation of this character has been enacted. In view of this earnest endeavor on the part of Congress to solve the problem of minimizing railway casualties, it is eminently fitting that the machinery provided should be utilized to the limit of its capacity.

The man at sea who saves a human life, the man upon a railroad who, at the risk of his own life, saves or attempts to save the life of another, is rewarded with a medal from the Nation. So, also, the consciousness of duty well performed is the reward of the Commission's inspector, who, by his unremitting efforts, contributes effectively to the preservation of life and limb, for what greater gratification can come to a man than that derived from the knowledge that by his efforts some human life has been saved to family and to country. Just so, in your deliberations in your annual conventions, and in your work when you go back to your various fields of labor, you can always bear in mind the inspiring thought that you are contributing to the safety of employees and the traveling public by maintaining your equipment in the highest possible state of efficiency.

Speaking for myself and for the inspectors of the Commission who are here to-day, I wish to express our appreciation of your coöperation and the kindly feeling which you accord us. [Applause.]

THE PRESIDENT: I will call on Mr. F. W. Brazier to respond to the remarks of Mr. Moseley.

MR. BRAZIER: Mr. Moseley, if I had the ability of the silver-tongued orator of the New York Central Lines, I do not know that I could coin words suitable to compliment you on the best address you ever made to us. It is very interesting to us all. I feel that this Association has powers almost equal to the United States Congress, because the Government, I know, will wait to see what the Master Car Builders' Association as a body deems the proper and best method for applying safety appliances before they will pass any laws that pertain to safety appliances. Consequently, it behooves us, as members of this Association, to be very careful that what we adopt as standard is right and is the best. Mr. Moseley, in behalf of the Association I want to thank you not only for your address.

but for the presence of the inspectors of the Interstate Commerce Commission who are with us to-day. In all fairness I want to say to you that we have found your inspectors to be men who have shown a spirit of fairness and not vindictiveness. We believe your presence and the inspectors here is of mutual interest.

Again thanking you, Mr. Moseley, and the inspectors, we wish you long life and prosperity. [Applause.]

THE SECRETARY: The Executive Committee submits to the Association with its approval for honorary membership, the name of A. G. Steinbrenner. Mr. Steinbrenner has been a member of the Association since 1883.

MR. W. H. LEWIS (N. & W. Ry.): I move that the proposition be approved.

Motion seconded and carried.

THE SECRETARY: The following notice regarding certain proposed amendments to the Constitution is submitted by the Executive Committee:

Notice is hereby given that at the convention of 1909, certain amendments will be submitted regarding all the articles of the Constitution. These proposed amendments are not yet in shape for distribution, but they will be sent to the members prior to the end of this year.

Some of the members of the Association have been advised of proposed changes in the organization of the American Railway Association, looking to the coördination of the work of the several railway associations with the American Railway Association. To carry this out some changes may be necessary in the Constitution and By-Laws of the Master Car Builders' Association.

Be It Therefore Resolved, That the President be authorized to appoint a subcommittee of three (3) members of the Executive Committee of the Association to confer with the proper committee of the American Railway Association and report to the Executive Committee so that the recommendations of the Executive Committee may be distributed to the members of the Association prior to December 15, 1908.

MR. J. F. WALSH (C. & O. Ry.): I move that the resolution be approved and the President be authorized to appoint such a subcommittee.

(Motion seconded and carried.)

The Secretary read the following letter:

ALTOONA, PA., June 17, 1908.

Mr. J. W. Taylor, Secretary M. C. B. and M. M. Associations, at Atlantic City, N. J.:

DEAR SIR,— Kindly notify the railroad members of the Master Car Builders' and Master Mechanics' Associations wishing transportation home over the lines of the Pennsylvania Railroad Company or Pennsylvania Lines west of Pittsburgh, that such transportation will be provided if they hand you their names.

Owing to the requirements of the law, this transportation must be limited to bona fide railroad officials only, and can not include members of boat lines, car lines, or switching roads, operated by industries.

Yours very truly,

A. W. GIBBS,
General Sup't M. P., P. R. R. Lines East of Pgh.
D. F. CRAWFORD,
General Sup't M. P., Penna. Lines West of Pgh.

THE PRESIDENT: The next order of business is the consideration of the reports of committees and the first on the program is the report of the Standing Committee on Revision of Standards and Recommended Practice, exclusive of protection to trainmen. Mr. T. S. Lloyd is chairman of the committee.

THE SECRETARY: I understand Mr. C. A. Seley is to represent Mr. Lloyd in presenting this report.

MR. GAINES: While we are giving out these papers I would like to make a very polite protest against the time we get our papers. I got my papers last Saturday, just one hour before I had to start to come here, and that did not give me time to look up the things I wanted. I think we ought to have those papers a full week before the convention opens, at least.

THE SECRETARY: I did the best I could to get them out on time. If the committees will get their reports into my office earlier I would be able to send advance copies to the members earlier. I had my office full of clerks and draftsmen trying to get the reports out promptly.

MR. SELEY: I would like to corroborate what the Secretary says. When a belated report, full of corrections, comes in, with blue-prints about eight feet long to reproduce while the report is in the printers' hands, it is very discouraging for the Secretary.

By request of the Chairman of the committee and members, I take pleasure in presenting the following report:

REPORT OF STANDING COMMITTEE ON REVISION OF STANDARDS AND RECOMMENDED PRACTICE.

To the Members:

(1) Your Committee sent out through the Secretary, on December 23, 1907, a circular letter of inquiry to all members, asking for their suggestions as to changes or corrections of standards. The suggestions made are noted in connection with their subject. Following is a complete list of the present Standards and Recommended Practice and the recommendations of your Committee relative thereto. (See pages 551 to 631, Report of Proceedings, 1907.)

STANDARDS.

STANDARD JOURNAL BOXES AND CONTAINED PARTS. Pages 552-553.

(2) For Journals 3¾ by 7 inches, Sheets M. C. B. 1, 2, 3: Mr. Ames, of the American Car & Foundry Company, suggests as follows: "Sheet 2, if dimension 7 inches width over box, 8 inches center to center of bolts and diameter of cores 1 1-16 inches are right, there should be a dotted line shown for edge of 1 1-16-inch core."

This sheet has been in use since 1893, and the criticism is of no real value.

(3) "There is a discrepancy in the full size and small sheets in the dimension 7½ inches in the note reading, 'Width of box over all, where lid fits, should be 7½ inches, in accordance with the ballot of 1891, instead of 7 inches as shown here.' On the large sheet the dimension reads 7⅜ inches, while on the small sheet it reads 7½ inches."

The criticism is not correct, as both sheets read 7⅜ inches.

(4) "Sheet 3, there should be a dimension given from the center line of lid to outside surface (on Sheet 6 for the same lid, this dimension is 3-16 inch)."

(5) We believe the dimension referred to should be the distance from the center line of the bolt hole to inside bearing face of lid, and would so recommend.

(6) For journals 4¼ by 8 inches, Sheets M. C. B. 4, 5, 6: Mr. G. R. Henderson recommends restoration of the inside dust guard wall for the same reasons as on 5 by 9 inch and 5½ by 10 inch boxes.

Your Committee approves this and suggests that the inside dust guard wall be restored at the top and that it be joined to the inside side wall with an opening 2¾ inches radius, with the center located one inch above the horizontal center line of the box.

(7) For journals 5 by 9 inches, Sheets M. C. B. 13, 14, 15: Mr. John McE. Ames suggests: "Sheet 14, change the dimension 5 3-16 inches from center line of journal box to edge of wedge stop to 5⅛ inches. This gives 1-16 inch clearance for wedge, which has been allowed on all of the other journal boxes."

(8) This change would have the effect of giving 1-16 inch clearance, same as on 4¼ by 8 inch and 5½ by 10 inch boxes. At present the 5 by 9 inch wedge has ⅛ inch clearance. The Committee would approve the suggestion.

(9) Mr. Ames suggests regarding Sheet 15: "Sheet 15 (a) dimension cotter for journal box hinge pin to agree with cotter for journal box hinge pin for 5½ by 10 inch journal box lid. (b) Give a dimension 4⅜ inches from center line to flange end of journal bearing."

(10) (a) These keys are identical, but the dimension figures are differently arranged, as per the draftsman's fancy. Do not consider a change essential. (b) Believe this dimension should be shown.

(11) For journals 5½ by 10 inches, Sheets M. C. B. 16, 17, 18: Mr. Ames makes the following criticism: "Sheet 17, on view, section 'BB,' change the dimensions for length of side lugs from ⅜ inch to 3⅜ inches."

This is draftsman's error and should be corrected.

(12) "Sheet 18, gives an over-all dimension for wedge 9 13-16 inches."

This is draftsman's error of omission which should be corrected.

(13) Mr. Wolf, Chief Mechanical Engineer of the American Car & Foundry Company, makes the following criticisms: "Plate No. 16, 1907 Proceedings, illustrating journal box and contained parts for 5½ by 10 inch journals, has a note reading, 'Total lateral (extreme positions of axle) equals ⅜ inch.' According to our figures, the total lateral equals ½ inch and is made up as follows: ¼ inch between rear end of bearing and front edge of dust-guard collar; 1-16 inch between rear end of wedge and bearing, and 1-16 inch between front edge of wedge and the stop lug on inside of box, totaling ¼ inch or ½ inch for both ends. If you will refer to the corresponding plate in the Proceedings of 1906, you will see that the distance from the center of the journal to the inside face of the stop lug for the wedge is shown to be 5⅝ inches, while the 1907 book gives this dimension as 5 11-16 inches, thus providing a clearance between the wedge and the stop lug. When this change was made, evidently it was overlooked, changing the note above referred to. Would it not also be advisable to add notes on Plates 1, 4 and 13, giving this same information?"

(14) It is agreed that there is an error in the note referred to. Instead of correcting this note and adding the information to other box drawings, the Committee recommends elimination of the note.

(15) Mr. Wolf also calls attention to the lip shown on the inside at the bottom of the opening for oil box lid on Sheets M. C. B. 13, 14, 16 and 17. This is a draftsman's error in copying the cuts in last year's report. This lip was not approved by the Committee nor by the convention, and next year's drawings should be revised in this respect.

(16) "On Plate 16, 1907 Proceedings, occurs a note reading, '5 11-16 inches to the end of wedge and face of stop.' On the corresponding plate in the 1906 Proceedings this dimension is 5⅝ inches, but in that case the end of the wedge and face of the stop were in contact. Now there is 1-16 inch clearance, therefore this note should read, '5 11-16 inches to face of stop.'"

The Committee approves the recommendation to change reading of the note covering dimension to face of stop.

(17) As regards the 5 by 9 inch and 5½ by 10 inch boxes, the Mechanical Engineers of the New York Central Lines, by Mr. Whyte, make the following suggestion: "Recommendations were made to enlarge the opening in the dust-guard walls, the principal idea being to give additional clearance between the axle and the dust-guard walls at the horizontal center line of the axle, but in cutting out for the side play the cutting was carried around the bottom, with the result that the height of these walls at the bottom of the boxes was materially decreased, thus decreasing the oil capacity of the box. Of course, this also permitted raising up the box a little higher, but so far as we are informed, this was not necessary. Therefore, we would suggest that the height of these walls at the bottom of the boxes be restored to what they were in 1906."

(18) Would advise that the 5 by 9 inch and 5½ by 10 inch boxes were changed last year, as per the recommendations of Mr. Muhlfeld, and the approval of this Committee, and passed in the letter ballot.

(19) It is now complained that the change which was to give more clearance has resulted in decreasing the depth and oil capacity below the top of dust-guard walls. Following are the respective depths:

	1906.	1907.	
4¼ by 8 inches..	1 11-16 inches.	1 11-16 inches..	No change
5 by 9 inches..	1 11-16 inches.	1⅜ inches..	5-16 inch shallower
5½ by 10 inches..	1 11-16 inches.	1⅝ inches..	1-16 inch shallower

(20) We would lose all of the benefit if we were to go back to 1906 dimensions, and instead of so doing we recommend for the 5 by 9 box, raising the center from which the lower half of the circle is struck ¼ inch, which would then make the depth 1⅝ inches, same as at present on

5½ by 10 inch boxes. Would suggest making no change in the latter box account of slight change from former standard.

(21) Mr. C. S. Morse, M. C. B., of the W. & L. E. R. R., suggests adding to the sheets showing journal boxes and contained parts, the standard dimensions for dust guards. The Committee is of the opinion that the matter should be referred to a special committee.

(22) As regards Standard Journal Boxes and Contained Parts, the Committee now offers for approval their decisions as to paragraphs 2 to 21, inclusive, and if approved, reference to letter ballot of the changes suggested in paragraphs 5, 6, 8, 14, 16 and 20.

Journal Bearings and Wedge Gauges. Page 554.

(23) For journals 3¾ by 7 inches, 4¼ by 8 inches, 5 by 9 inches and 5½ by 10 inches, Sheet M. C. B. 22. The Committee has no changes to suggest.

Axles. Pages 554 to 556. Sheet M. C. B. 7.

(24) On August 18, 1907, Mr. O. C. Cromwell, M.E., of the Baltimore & Ohio, wrote Secretary Taylor by direction of Mr. J. E. Muhlfeld, G. S. M. P., regarding the design of M. C. B. car axles. It was stated that they had had some instances of failures of the axles at the center due to grooving at the juncture of the cylindrical portion with the tapered portion. To overcome this they have changed their drawings to gradually work the taper down to the center, joining the tapered portions with the following radii:

Axle A.— 3¾ by 7 inch journal, 13 feet 0 inches radius,
Axle B.— 4¼ by 8 inch journal, 14 feet 0 inches radius,
Axle C.— 5 by 9 inch journal, 15 feet 0 inches radius,
Axle D.— 5½ by 10 inch journal, 26 feet 8 inches radius.

The Committee does not approve the suggested modification, believing that in the rough forgings it would be impossible to closely approximate the radii stated, particularly with the very small length of arc, and that the grooving which is complained of should have been noticed in the inspection and might occur even with the change of design.

(25) The Griffin Wheel Company submits the following: "You will note from the following that the radii of the fillets at the back end of the wheel-seats, dust collar-seats and journals on the axles of different capacities are not uniform, which necessitates the changing of tools in turning them up. If uniform radii were maintained at these points on each individual type of axle, there would be quite a saving in the cost of turnings:

	40-M.	60-M.	80-M.	100-M.
"Back end of wheel-seat........	¾ inch	¾ inch	¾ inch	¾ inch
Back end of dust collar-seat...	¼ inch	¼ inch	¼ inch	¼ inch
Back end of journal...........	¼ inch	⅝ inch	¾ inch	¾ inch"

(26) The Committee has considered this recommendation and suggests changing the fillet at the back end of journal on 40,000 and 60,000 pound axles A and B to ¾ inch, conforming to the dimension on the back end of wheel seat of these axles and also of axles C. & D.

(27) Mr. Wolf suggests the following correction: "Referring to Plate No. 7, standard axles: The drawings show the ¾-inch radius at the back of the wheel fit as being taken from a line 1¼ inches from the inside edge of the collar. This seems to be an error; this dimension should be 1 5-16 inches, as the Proceedings clearly indicate that the ¾-inch radius is taken from a point coincident with the face of the hub of the wheel."

(28) A check of the drawing shows that he is correct and the dimension should be changed.

(29) Regarding axles, the Committee now offers for approval their decisions as to paragraphs 24 to 28, inclusive, and if approved, reference to letter ballot of the changes suggested in paragraph 26.

FORM OF WHEEL TREAD AND FLANGE. Page 556, Sheet M. C. B. 7.

(30) The Committee has no changes to suggest, but it is possible that the report of the Committee on Cast-iron Wheels may have some change to propose.

WHEEL CIRCUMFERENCE MEASURE. Page 557, Sheet M. C. B. 7.

(31) The Committee has no changes to suggest.

BRAKE HEAD AND SHOE. Pages 557, 558, Sheet M. C. B. 8.

(32) The Mechanical Engineers of the New York Central Lines, by Mr. Whyte, suggest as follows: "M. C. B. Sheet 8, Brake Head: We would suggest that the recess located on the center line of the head and opening directly from the face and the one above it which opens directly from the face should be omitted and only the hanger eye which is entirely surrounded by the metal of the head be stamped with approval. When the hanger is placed in the recess opening directly through the face of the head, and it happens that the shoe and key are lost, it is likely that the brake beam would be lost or drop down, and the ordinary safety chains would not hold the beam. Therefore, we think it is not desirable to place hangers in such openings."

(33) This radical suggestion does away with the use of all stirrup hangers, confining us to the pot-hook variety or some new design necessarily of several parts and more liable to failure than the present type. The stirrup hanger gives ample wearing bearing, lessens the tendency to side swing, and has less lost motion vertically, and as no substitute hanger of merit is offered, would suggest that this recommendation be not approved.

(34) Mr. Morse, of the W. & L. E. R. R., suggests: "Sheet M. C. B. 8: Would change length of brake shoe key so it may be bent back over head to prevent its being lost when cars are turned upside down in car dumpers. Our standard key is one inch longer than the standard M. C. B. key for this reason. As practically all coal car equipment is sooner or later turned in car dumpers, and as the number of car dumpers along the lakes are constantly increasing, we consider this a very important matter."

(35) The Committee does not agree that the conditions named are sufficiently general to warrant the proposed change.

(36) "I would recommend that the M. C. B. standard brake shoe be made of such dimensions as to give the shoe a weight of twenty-five pounds, thus reducing the number of changes necessary and at the same time giving a considerable larger percentage of wearing material in the shoe. In order to prevent the wrong application of the shoe by car repairers, I would suggest making both sides of the same thickness and giving both corners a radius."

(37) The Committee does not approve above paragraph in which the increase of weight of twenty-five pounds is recommended, believing that on very many cars this weight of shoe could not be used. The standards have already been changed with reference to making both sides of the same thickness and giving both corners a radius.

(38) Mr. Gibbs, of the P. R. R., suggests: "Increase to 9-16 inch in depth on level with top and bottom stop for brake head the present 5-16-inch projection, top and bottom, at back of brake shoe which forms spacer between lugs of brake head. This for the purpose of better maintaining the position of shoe."

The Committee approves this suggestion.

BRAKE BEAMS. Pages 558-559, Sheet M. C. B. 22.

(39) The recommendations of this Committee made last year (1907) regarding brake beams were all adopted except the three questions covering the standard beams and tests. It is the belief of the Committee that standard beams are advisable and desired by the Association, and that the objection which defeated the adoption of the standards proposed was principally on account of the test limitation which barred economical commercial sections for solid beams. The Committee, therefore, has determined to lower the limits of deflection for 1-16 inch to 6,500 pounds for No. 1 beams and 12,000 pounds for No. 2 beams. The 6,500-pound limit will permit the use of six inch 12¼-pound I-beam sections for use on light cars, and the 12,000-pound limit will provide beams of ample strength for all heavy freight equipment unless of special character. These standards have no reference to passenger car requirements and high-speed brakes.

(40) The Committee's recommendation of last year regarding the two beams was to adopt as standard, brake beam No. 1 for cars weighing

not over 35,000 pounds light weight, and brake beam No. 2 for cars exceeding 35,000 pounds light weight. Having in mind the lowering of the test limitation the Committee renews the above recommendations, but will approve a slight variation in the dividing line if decided upon after debate of this recommendation.

(41) Mr. John Hair, S. M. P., of the B. & O. S. W. Ry., suggests that: "Manufacturers of brake beams plainly mark all beams with the name and some marking to indicate the capacity of the cars that the beam is suitable for."

Inasmuch as the Committee's recommendations of last year for standard brake beams were defeated in the letter ballot, the Association has no standard brake beams and, therefore, can not direct manufacturers with reference to marking.

(42) "On Sheet M. C. B. 22, location of fulcrum lever pin holes should be shown on brake beam drawing."

Regarding M. C. B. Sheet No. 22, would say that inasmuch as our proposed brake beam standards permit the use of two different locations of the fulcrum pin hole, that the statement of the text is sufficient and it might be confusing to put this on the drawing.

(43) Mr. Wolf suggests: "Regarding brake beams, the Proceedings state that the location of the fulcrum pin hole is to be two or three inches in front of the top of the brake head lugs. We sometimes find that it is necessary to hang a beam at different heights from the M. C. B. standard and when this is done it necessarily changes the location of the pin hole if the measurements were made parallel to the rail. We are of the opinion that what the Committee on Brake Beams had in mind was to maintain the standard lengths of the bottom connections for cars of different wheel base, and if this is the case, I would suggest that the drawings be revised to cover this point more clearly."

The Committee does not approve of any change regarding location of fulcrum pin hole, believing that the two standards which we have suggested are the best that can be done under the circumstances, and furthermore we can not make provisions for brake beams that are not of standard height

(44) The Committee asks approval of their decisions on brake beams, and that the recommendations in paragraphs 38 and 39 be referred to letter ballot.

BRAKE BEAM GAUGE. Page 557, Sheet M. C. B. 22.

(45) The Committee has no changes to suggest.

BRAKE HEAD GAUGE. Page 557, Sheet M. C. B. 22.

(46) The Committee has no changes to suggest.

LEVER PIN HOLE GAUGE. Page 559, Sheet M. C. B. 22.

(47) The Committee has no changes to suggest.

SPECIFICATIONS FOR BRAKE SHOES. Page 558.

(48) The Committee has no changes to suggest.

AIR BRAKES, GENERAL ARRANGEMENT AND DETAILS, Pages 559-560, Sheet M. C. B. 9.

(49) Mr. Morse, of the W. & L. E. R. R., suggests: "Sheet M. C. B. 9.— Would recommend standard length of twenty-six inches for push rods. This is the length used by some of our larger car companies, and in order to secure interchangeability would like to see it generally adopted where the construction of the car permits."

The Committee does not approve the suggestion regarding Sheet M. C. B. 9 to use a standard length of 26 inches for push rods, while no doubt this length of rod is in most general use. All roads having any variety of equipment are compelled, by reason of questions of design, to have other lengths as well.

(50) "Brake Shaft.— Would recommend a standard diameter for brake shaft which would call for a standard ratchet wheel, pawl, and plate. The upper end at least should be made standard, so that all brake wheels will be interchangeable. It might be well also to specify a maximum and minimum diameter for brake wheels. There is apparently no reason why the diameters of the drum at the lower end of brake shaft should not also be made standard."

(51) Mr. Gibbs, of the P. R. R., suggests: "Recommend that a committee be appointed to present designs showing standard brake shafts, brake wheel and brake wheel fit, ratchet wheel and ratchet wheel fit, and uniform methods of fastening brake wheel and ratchet to staff. The brake shaft should be made from one piece, and a requirement added that brake staffs must not be welded in making repairs.

"As this is a very essential part of the equipment, it is thought desirable to have a uniform construction and manner of fastening these parts."

Regarding recommendations covering the brake shaft for standard diameters at the top and bottom and for fit of the ratchet wheel, etc., believe that this would be good work for a special committee.

(52) The attention of the Committee has been called to an article on standard air brake couplings and gaskets in the *Railway Age*, of January 31, 1908, page No. 164, by Mr. William Forsythe, M. E., with an idea of bringing this matter to the attention of the convention.

In order to fully understand the position of the Air Brake Association on this detail a letter was written to Mr. Nellis, asking if that association had made any definite recommendations on this subject. We are advised, under date of April 1, that the Air Brake Association has not considered such standardization, but the matter would be put before their executive committee, and, if possible, we will get an expression from them before the adjournment of our convention.

(53) Mr. Wolf, of the American Car & Foundry Company, suggests: "Plate 9, details of foundation brake: This plate, in my opinion, is rather misleading, as it does not make provision for variation in diameters of rods to suit different types of air-brake equipment. I would recommend that a note be added on the cylinder and floating lever connection providing for a larger diameter rod when used in connection with 10-inch cylinders. I think also that the cylinder and floating levers should be increased in size when 10-inch cylinders are used. On this plate it is also shown that the center of the train pipe is to be located 13 inches from the center of the car. This arrangement is very satisfactory in wooden-car construction, but we have had a good deal of trouble with steel cars, particularly when 7-inch shank couplers are used, the angle cock interfering with the carry iron, and in order to apply a suitable pipe clamp I have been obliged in a number of instances to move the train pipe over 2 inches. In view of the difficulties we have encountered, I would recommend that the 13-inch spacing be followed for cars having center sills spaced 10 inches or less, but that the dimension be made 15 inches for cars having center sills spaced 12¾ inches or more. There is an apparent discrepancy here, but the fact is that we seldom construct cars with the center sills spaced between the dimensions 10 and 12¾ inches."

The Committee is of the opinion that proper rods and other details of foundation brake should be worked up by a special committee and recommends such reference of this paragraph.

(54) The Mechanical Engineers of the New York Central Lines, by Mr. Whyte, suggest:

"M. C. B. Sheet 9.—We think that the length of the nipple at each end of the pipe should be shown on this drawing; the nipple is shown in the piping arrangement, but the length of it is not shown. On page 560 of the 1907 Proceedings, the fourth paragraph from the top, you will find that in 1900 it was decided to show the nipple 10 inches long directly back of the angle cock; we think that the standard dimension for the nipple should be shown on the piping arrangement on M. C. B. Sheet No. 9."

Inasmuch as a 10-inch length of nipple is already standard, would approve showing this dimension on the drawing on Sheet M. C. B. 9, with a note reading, "for new cars or complete new train pipes."

(55) Mr. Gibbs, of the P. R. R., makes the following suggestions:

"Outside Hung Brakes: On cars built after September 1, 1909, it will not be permissible to hang brake beams from any portion of the body of the car."

"When brakes are hung from body of the car, the raising and lowering of the car, when empty or loaded, due to the action of the truck springs, seriously interferes with the brake slack, and it is impracticable to adjust the piston travel as frequently as it is necessary. It is, therefore, an undesirable standard, and we believe reference to the same should be omitted, and provision made that on cars built after a certain date it will not be permissible to hang brake beams from any portion of the body of the car."

The Committee approves this suggestion.

(56) "Size of Brake Chain: Increase size of brake chain from ⅜ inch to 7-16 inch and show same on M. C. B. Sheet No. 9, together with the size of machine bolt, fastening the brake chains to the brake staff, which should be ½ inch diameter. Change text to correspond.

"This is considered desirable on account of the rapid deterioration of the ⅜-inch chain in service, which is especially marked on refrigerator cars, but is common to all cars."

The Committee does not approve this suggestion as stated, but would recommend instead change of text (page 560) as follows:

"That ⅜-inch straight link chain be made standard for hand brake chain, except on cars on which there is rapid deterioration, on which 7-16-inch chain shall be used, the hand brake chain to be attached to mast by a ½-inch machine bolt instead of an eye bolt."

The Committee asks approval of their decisions on air brakes, paragraphs 47 to 52, inclusive.

HEIGHT OF BRAKE STAFF. Page 573.

(57) The Committee has no changes to suggest.

LABEL FOR AIR-BRAKE HOSE. Page 585, Sheet M. C. B. 9.

SPECIFICATIONS FOR AIR-BRAKE HOSE. Pages 586 to 589.

(58) These matters are in the hands of a special committee.

AIR-BRAKE REPAIR CARD. Pages 580 to 581.

(59) The Committee has no changes to suggest.

AUTOMATIC COUPLERS. Pages 560 to 563, Sheet M. C. B. 11.

CONTOUR LINES AND LIMIT GAUGES FOR AUTOMATIC COUPLERS. Pages 563, Sheet M. C. B. 11.

GAUGE FOR WORN COUPLERS. Page 563. Sheet M. C. B. 12.

SPECIFICATIONS FOR M. C. B. COUPLERS. Pages 563 to 569.

SPECIFICATIONS FOR SEPARATE KNUCKLES. Pages 569 to 571.

HEIGHT OF COUPLERS. Page 573.

ADJUSTING HEIGHT OF COUPLERS. Pages 578 to 579.

(60) Recommendations on couplers and matters related thereto should

come from the standing committee on that subject, which will probably have a report for your consideration. This Committee has forwarded to the Coupler Committee all suggestions received on above subjects.

TERMS AND GAUGING POINTS FOR WHEELS AND TRACK. Pages 571 to 572, Sheet M. C. B. 12.

(61) The Committee has no changes to suggest.

GUARD RAIL AND FROG WING GAUGE. Page 572, Sheet M. C. B. 12.

DISTANCE BETWEEN THE BACKS OF THE FLANGES OF CAR WHEELS. Page 572.

STANDARD REFERENCE GAUGE FOR MOUNTING AND INSPECTING WHEELS AND CHECK GAUGE. Page 572 to 573, Sheet M. C. B. 12.

WHEEL FLANGE THICKNESS GAUGES FOR NEW WHEELS. Page 573, Sheet M. C. B. 12.

WHEEL DEFECT GAUGE. Page 586, Sheet M. C. B. 12.

(62) Recommendations on cast-iron wheels and matters related thereto should come from the standing committee on that subject, which will have a report for your consideration. This Committee has forwarded to the Wheel Committee all suggestions received on above subjects.

PROTECTION OF TRAINMEN. Pages 582 to 585, Sheet M. C. B. 19.

(63) A special committee having been appointed to report on this subject, all recommendations received have been referred to that committee.

PEDESTALS FOR JOURNALS 3¾ BY 7 INCHES. Page 560, Sheet M. C. B. 10.

(64) Mr. Ames, of the American Car & Foundry Company, suggests: "Sheet 10, on the end view show and dimension bolt holes for wheel piece which are dimensioned 17 inches center to center on elevation. The plan view of the 3¾ by 7 inch passenger journal box should be removed and the journal box detailed on a new sheet."

This drawing has done service since 1893, and owing to its age and the small number of this size pedestal and boxes now required, we doubt the need of any change.

PASSENGER CAR PEDESTAL FOR JOURNALS 4¼ BY 8 INCHES. Page 580, Sheet M. C. B. 20.

(65) The Committee has no changes to suggest.

CENTER PLATES. Page 586, Sheet M. C. B. 22.

(66) The Committee has no changes to suggest.

ARCH BARS AND COLUMN BOLTS FOR 80,000-POUND CAPACITY CARS. Page 578, Sheet M. C. B. 22.

(67) Mr. G. S. McKee, of the M. & O. Ry., suggests consideration of standard arch bars for trucks for 50,000 and 100,000 pound capacity cars. Mr. Gibbs, of the P. R. R., suggests as follows:

(68) "Add to Sheet 22, journal box bolt and dimensions, and specify single nut with nut lock under head and nut of bolt; on the column bolt specify a nut lock under head of bolt on which single nut with nut lock is used. Where washer is used under head in place of nut lock, the same to be so constructed as to prevent head from turning."

(69) "Recommend the addition as Recommended Practice of nut locks at top and bottom of all column and journal box bolts, and discontinue the double nutting of such bolts."

(70) "Recommend that a committee be appointed to submit standard designs of arch bars and column and journal box bolts for 100,000-pound capacity trucks.

"The recommendation of the committee which was appointed to look into this matter several years ago failed to pass the letter ballot, and it is believed that a standard design of arch bars, column and journal box bolts is very essential on account of interchangeability, in view of most new cars being constructed of this capacity."

The Committee approves these recommendations and suggests their reference to special committees.

SIDING, ROOFING, FLOORING AND LINING. Page 578, Sheet M. C. B. 24.

(71) Mr. Wolf, of the American Car & Foundry Company, suggests:

"Plate 24, Standard Siding, Roofing and Flooring.—The diagrams of siding, lining and roofing are very satisfactory and fill a long-felt want, but I feel that a change should be made in the flooring. It is the practice of the mills all over the country to dress flooring to a face width ¼ inch greater than that shown on plate 24. The widths of flooring in general use are 5¼, 7¼ and 9¼ face for both tongued and grooved and ship-lapped material. The width of the ship-lap and tongue as shown on the plate conforms to standard practice. I sincerely hope the Committee will look into this matter and make this revision so that the standard of the Association will be in accordance with the practice of the car builders and lumber mills throughout the country."

The Committee approves this suggestion.

(72) Mr. Ames, of the American Car & Foundry Company, suggests:

"Standard roofing, siding and flooring shown on sheet 24 shows chamfered edge on siding. A note should be added to show that this applies only to outside sheathing and not to roofing or inside lining."

This criticism is correct, but instead of adding a note the drawing should be revised to show separate drawings of roofing and lining. We also suggest adding a flooring, section 2⅜ inches thick, now in common use in cars for rough freight.

UNIFORMITY FOR SECTIONS OF CAR SILLS. Page 577.

(73) The Committee has no changes to suggest.

PIPE UNIONS. Pages 586.

(74) Mr. Gibbs, of the P. R. R., suggests as follows:

"Recommend necessary modification in text and table so that threads on pipe and fittings will be uniform and taper tight, or what are known as trade line fittings, to insure the same taper on the fittings as on the pipe."

The Committee approves this suggestion.

SCREW THREADS, BOLT HEADS AND NUTS. Pages 573 to 576.

(75) The Committee has no changes to suggest.

SQUARE BOLT HEADS. Page 577.

(76) The Committee has no changes to suggest.

STENCILING CARS. Pages 579-80.

(77) This matter is in the hands of a special committee.

M. C. B. REPORTS. Page 577.

(78) The Committee has no changes to suggest.

PAMPHLETS, CATALOGUES, SPECIFICATIONS, ETC. Page 577.

(79) The Committee has no changes to suggest.

RECOMMENDED PRACTICE.

SPECIFICATIONS FOR IRON AXLES. Pages 589 to 591.

(80) The Committee has no changes to suggest.

SPECIFICATIONS FOR STEEL AXLES. Pages 591 to 594.

(81) The Committee has no changes to suggest.

SPECIFICATIONS FOR KNUCKLE PIVOT PINS. Pages 597-598.

(82) This matter is in the charge of a standing committee.

SPECIFICATION FOR WOVEN AND COMBINATION WOVEN AND WRAPPED AIR-BRAKE HOSE. Pages 600 to 602.

(83) The Committee on Air Brake Hose makes the following recommendation:

"We recommend to your Committee that the specifications for woven and combination woven and wrapped air-brake hose to be submitted to the Convention to be advanced to a Standard.

"The M. C. B. Rules will require, after September 1, 1908, that cars delivered in interchange be equipped with M. C. B. Standard Hose.

"The present M. C. B. Specifications do not permit the use of woven hose. By advancing the recommended practice to a standard this will be provided for."

The Committee recommends that the above specification be advanced to a Standard.

SPECIFICATIONS FOR 33-INCH CAST-IRON WHEELS. Pages 610 to 612.

(84) This matter is in the hands of a standing committee.

SPECIFICATION FOR TANK CARS. Pages 615 to 623.

(85) The Committee has no changes to suggest, as this subject is in the hands of a special committee.

AIR BRAKE AND TRAIN AIR SIGNAL INSTRUCTIONS. Page 595.

(86) The Committee has no changes to suggest.

AIR-BRAKE APPLIANCES. Page 602, Sheet M. C. B.— G.

(87) Mr. Gibbs, of the P. R. R., makes the following suggestion:

"M. C. B. Sheet G, Page 602.— Recommend to change legend on cut showing location of air-brake parts, so as to specify that it applies to wooden cars only."

(88) "Recommend the adoption as Recommended Practice of brake-staff bow, so that the half yoke or carrier iron extensions now largely used will not be extended to new cars."

The Committee approves these suggestions.

AIR-BRAKE TESTS. Pages 603 to 607.

(89) This matter is in charge of a standing committee.

Air-brake Cleaning. Pages 625 to 628.

(90) The Committee has no changes to suggest.

Steam and Air-line Connections. Pages 609, Sheet M. C. B.— E.

(91) The Committee has no changes to suggest.

Brake Beams. Pages 623.

(92) The Committee has no changes to suggest.

High-speed Foundation Brake Gear for Passenger Service. Pages 612 to 615, Sheets M. C. B.— J, K. L.

(93) The Committee has no changes to suggest.

Signal Lamp Brackets and Sockets. Page 609, Sheet M. C. B. —E.

(94) The Committee has no changes to suggest.

Uncoupling Arrangements for M. C. B. Couplers. Page 5[illegible]7, Sheet M. C. B. — B.

(95) Mr. Wolf, of the American Car & Foundry Company, calls attention to the drawing under above heading, showing slotted knuckle. This should be changed. Mr. Ames advises " Sheet B on detail of bracket No. 1, the dimension reading 4¼ inches should read 5¼ inches." Criticism is correct and change should be made.

Twist Gauge for New Couplers. Page 607, Sheet M. C. B.— G.

Knuckles. Page 629.

(96) These matters are in charge of a standing committee.

Cast-iron Wheels. Page 610, Sheet M. C. B.— J.

Mounting Wheels. Pages 599-600.

Limit Gauges for Inspecting Secondhand Wheels for Remounting. Page 610, Sheet M. C. B.— J.

(97) These matters are in charge of a standing committee.

Minimum Thickness for Steel Tires. Pages 599, Sheet M. C. B.—A.

(98) The Committee suggests the appointment of a special committee to prepare drawing showing limit of wear of solid rolled steel wheels

to show in connection with the above, and also in the rules of Interchange, provided this is agreeable to the Arbitration Committee.

LIMIT GAUGES FOR ROUND IRON. Pages 594-595.

(99) The Committee has no changes to suggest.

CHECK CHAINS. Page 595.

PLATFORM SAFETY CHAINS. Page 596.

(100) The Committee has no changes to suggest.

SAFETY CHAINS FOR FREIGHT CARS. Page 599, Sheet M. C. B.— A.

(101) Mr. Gibbs, of the P. R. R., makes the following suggestion:

"Suggest that the term 'Permanent Safety Chains for Freight Cars' be changed to read 'Permanent Safety Chains for Wooden Underframe Freight Cars.' Also on same sheet, change the term 'Permanent Safety Chains for Steel Cars' to read 'Permanent Safety Chains for Steel and Steel Underframe Freight Cars.'"

The Committee would approve these suggestions.

SAFETY CHAINS FOR DOUBLE LOADS. Page 630, Sheet M. C. B.— B.

(102) The Committee has no changes to suggest.

PERMANENT STAKE POCKETS. Pages 628-629.

TEMPORARY STAKE POCKETS. Page 629.

LONGITUDINAL SPACING OF TEMPORARY STAKE POCKETS. Page 597, Sheet M. C. B.— A.

(103) The Committee has no changes to suggest.

FRAMING OF BOX CARS. Page 609, Sheet M. C. B.— K.

INSIDE DIMENSIONS OF BOX CARS. Page 610.

HEIGHT AND WIDTH OF CARS. Page 610.

(104) The Committee has no changes to suggest.

MARKING CARS. Page 595.

MARKING FAST FREIGHT LINE CARS. Page 596.

STENCILING CARS. Page 630, Sheet M. C. B.— M.

BOX CAR SIDE DOOR AND END DOOR FIXTURES. Page 607, Sheet M. C. B.—F.

PEDESTAL AND JOURNAL BOX OF PASSENGER CARS FOR JOURNALS 5 BY 9 INCHES. Page 609, Sheets M. C. B.— C and E.

(105) Above subjects are all in the hands of special committees.

SPRINGS AND SPRING CAPS FOR FREIGHT CAR TRUCKS. Page 607, Sheet M. C. B.— H.

(106) The Committee has no changes to suggest.

COLLECTION OF SALT WATER DRIPPINGS. Page 607, Sheet M. C. B.— A.

(107) The Committee is of the opinion that the present Recommended Practice on this subject is not being followed very closely, and that track and bridges are still being damaged by brine dripping from refrigerator cars. It is suggested that a special committee be appointed to review this Recommended Practice with a view of presenting a revision that will be acceptable.

SPLICING OF CENTER SILLS. Pages 629-630, Sheet M. C. B.— G.

(108) The Committee has no changes to suggest.

DROP TEST MACHINE. Page 608, Sheet M. C. B.— I.

KNUCKLE PIVOT PIN TESTING MACHINE. Page 598, Sheet M. C. B.— I.

(109) The Committee has no changes to suggest.

RULES FOR LOADING LONG MATERIAL. Page 599, Sheets M. C. B.—D, D1, D2.

(110) This matter is in charge of a standing committee.

RULES FOR EXAMINATION OF CAR INSPECTORS. Pages 624-625.

(111) The Committee has no changes to suggest.

MISCELLANEOUS. Pages 630-631.

(112) The Committee has no changes to suggest.

(113) Mr. Ames, of the American Car & Foundry Company, suggests an entire revision of the drawings showing the Standards and Recommended Practice, "so as to bring them into a more logical relation. Believe it would be advisable to have one set of numbered sheets only and under each detail give title, and mark either 'Standard' or 'Recommended Practice' with date of adoption."

Your Committee does not agree that it would be advisable to abandon the present arrangement of sheets and can not see sufficient advantage in a rearrangement to repay the Association for the expense of new drawings and cuts.

We believe that the most improvement possible will be in rearrangement of the text and the indexing thereof, and in the compiling of this report special attention has been paid to this question, and it will be found that the items in the report have been grouped and considered consecutively and with regard to logical relation as far as possible. The Committee would suggest that the Standards and Recommended Practice be arranged in the next issue in the order of subjects as given in this report. The index also can be amplified to cover very completely all subjects both as to page number and sheet number.

(114) All of the items listed in the Standards and Recommended Practice as they appear in the Proceedings of 1907 have now been noted, and the recommendations of your Committee are respectfully submitted.

T. S. Lloyd, Chairman,
J. E. Buker,
T. M. Ramsdell,
W. C. A. Henry,
G. H. Gilman,
Committee.

Chicago, Ill., April 7, 1908.

Mr. Seley read Sections 1 to 21 of the report.

Mr. R. P. C. Sanderson (Virginian Ry.): I move that the recommendation of the committee be accepted.

Mr. J. E. Muhlfeld (Baltimore & Ohio R. R.): Referring to paragraphs 7 and 8, the Baltimore & Ohio has used since 1897 the ⅛-inch clearance and we believe that the Pennsylvania and some of the other railroads have done the same. We consider that the 1-16-inch clearance is not sufficient under the ordinary service conditions. My suggestion would be that it be altered by changing the figure of 1 7-16-inch to 1⅜-inch, which is the dimension that now exists. Referring to paragraph 12, that change would make the over-all dimension 9¾ inches instead of 9 13-16 inches. I make a motion to cover those suggestions.

Mr. Seley: So far as the committee is concerned in this matter, we believe that there should be a uniformity of clearance of all of the different boxes. We have called attention to the fact that the 5 by 9 inch journal box has ⅛-inch clearance, while the 4¼ by 8 has 1-16-inch clearance. I think the committee would be perfectly willing to accept suggestions provided it results in a uniform clearance for all boxes.

Mr. Muhlfeld: I may say that we have used the 9¾-inch over all wedge. Other railroads have done the same, so that they have not followed out the dimensions shown in the Master Car Builders' drawings. It is a practice that has been quite general in cars that have been built for quite a number of years.

Mr. F. F. Gaines (Cent. of Ga. Ry.): I move that we let this go to letter ballot whether we have the 1-16 or ⅛-inch clearance, and then make it standard for all.

Mr. Seley: The committee would approve such a disposition of the matter and put it up to the Association whether ⅛ or 1-16 inch should be the ruling dimension.

Mr. Hennessey: I move that there be ⅛-inch clearance instead of 1-16-inch uniform, if the committee will accept that.

Mr. Schroyer: I think this matter is of great importance. The least irregularity in the setting of that core which forms the box we are talking about will vary to such an extent as to prevent us from getting the wedges in. I think in submitting this to letter ballot we ought to put in the two dimensions and let us see which we prefer. We can look over the drawings, and measure it up, and vote intelligently. As we are doing it now, if we say ⅛-inch shall be the clearance, we are doing it from recollection and not from absolute knowledge of what the conditions are. I am strongly in favor of the two dimensions being submitted.

Mr. Seley: I take exception to the remark that it is a matter of recollection. It is a matter of absolute measurement of the drawings. We all know that those dimensions check out in that way, so it is a matter of the practical working out of this clearance on the cars, and in order to bring this matter before this meeting I will second Mr. Hennessey's motion that it be made ⅛-inch.

Mr. Davis: I agree with Mr. Schroyer. I can see no possible harm coming from this opportunity to go over this individually and vote after having done so, rather than now. I would like to have seconded Mr. Schroyer's motion, but I can not do it now.

Mr. Schroyer: I move an amendment to the present motion and that is to the effect that the two dimensions be submitted in such a manner as to enable us to vote on either of the dimensions we desire. When I say it is a matter of recollection, it is with me. Mr. Seley can see things just as they are. I can not; but I prefer to look at the drawings before I vote on it.

Mr. Davis: I second Mr. Schroyer's amendment if it is in order.

The Secretary: The amendment to be voted on is that the report be received and the two dimensions be in the letter ballot.

Motion carried.

The Secretary: Now the original motion as amended.

Motion carried.

The Secretary: Now the motion before the house is that the recommendation of the committee as given in paragraph 22 be approved with the modifications already voted on, that is, that paragraphs 5, 6, 8, 14, 16 and 20 be referred to letter ballot.

The President: All in favor of the motion please signify it by saying "aye."

Motion carried.

(Mr. Seley here continued the reading of the report.)

The President: What is your pleasure with the committee's recommendation relative to the axles?

Mr. Muhlfeld: Referring to paragraph 24 relative to the forging of axles, we do not consider that it would be any great difficulty to approximate the desired radii. We know of cases where accidents have resulted due to breakage of 5½ or 10 inch journal axles, and when the cause of an accident is known and it is possible to eliminate it, I think we should do so. We have had on the Baltimore & Ohio several accidents due to the defined junction between the cylindrical and tapered portions of the axles, and I think it is a serious matter.

THE PRESIDENT: Any further discussion on that subject?

MR. MUHLFELD: I have on the subject as a whole, yes.

THE SECRETARY: We are discussing paragraphs 22 to 29, Mr. Muhlfeld.

MR. MUHLFELD: I think paragraphs 25 and 26 with reference to increasing the radii at the shoulder of the 3¾ by 7 and 4¼ by 8 journal axles should receive serious consideration. When applying an old bearing to these new journals it is going to result in heating. As long as these dimensions have been in effect for this length of time, I do not see why we should aggravate the liability of heated bearings by making a change now.

MR. SCHROYER: I agree with the gentleman in so far as the radius of the axle is concerned, and we are liable to get into serious trouble by making a change. We now have the chillers suitable to the journals where all can be controlled and made alike. If then we change the radii — the trouble is going to be in getting it now, that where an old journal bearing is put on to the new journal you will undoubtedly have heating, and if you change your journal-bearing patterns and cut out all your journal bearings to fit the radii you will have trouble when the old journal is applied to the new box; it will find the bearing along the dust collar and you will have trouble from heating from that cause. I think it would be ill advised to make a change.

MR. P. M. HAMMETT (Maine Central R. R.): I would like to corroborate that. I have recently experienced this very trouble by reason of careless shopwork in turning journals on new axles. Reported cases of hot journals on new axles in passenger cars immediately after leaving the shop were finally found to be due to fillets on the journals larger than standards. I think this matter too serious to justify a change without more thorough investigation.

THE PRESIDENT: Is there any further discussion on the subject? The motion is to refer the matter covered in paragraph 29 to letter ballot.

MR. J. F. DEEMS (New York Central): As I understand it, after Mr. Seley's explanation, Mr. Schroyer's motion does not cover this point in that way. I think Mr. Schroyer should change his motion.

MR. SCHROYER: The motion is not mine. I think if we are of the opinion the radii of that journal should not be changed it would be nonsense to submit it to letter ballot, and I do not think it requires much knowledge to know that it would be a mistake to make that change. For that reason, I do not think it should be submitted to letter ballot, and for that reason, I propose to vote against it.

MR. J. J. TATUM (B. & O. R. R.): I do not think that a motion should be made to submit this matter to letter ballot, and I think it should be decided right here. The fact that we have had hot boxes from the simple cause for which we are making a recommendation here, where cars have been repaired on foreign roads and new axles applied, I think is sufficient to show that such action should not be taken.

MR. SCHROYER: Let every one who has had trouble with hot boxes vote " No," and you gentlemen who have never had any trouble with hot boxes, vote " Yes."

MR. J. W. MARDEN (B. & M. R. R.): It seems to me that Mr. Hammett's trouble has occurred with present conditions, under the present rules, and it probably would not have occurred if we had had a uniform practice. The question in my mind is, whether, if we continue as we now are, we will not have the same trouble from the fact that if certain roads will turn up the fillet as they think it ought to be turned, which undoubtedly, from what I have heard to-day, would mean a larger fillet, we would still be having our trouble. Now, if a uniform practice can correct and improve that which is giving us trouble to-day, and will give us trouble forever if it is allowed to stand as it is, it seems to me we had better correct and improve the matter and adopt a uniform practice, and stand whatever little trouble we may have during the interim.

Mr. G. W. Wildin (N. Y. N. H. & H R. R.): I move that the committee's recommendation be rejected.

The President: There is a motion before the house to refer it to letter ballot.

Mr. Muhlfeld: The proposed changes in the axles and radii of the journals and bearings should be considered from the standpoint of safety. We have had cases of broken axles and burned journals due to the present method of forging axles as prescribed by the M. C. B. Association, and due to the proposed changes in journals and journal bearings.

Mr. Wildin: The motion to submit this matter to letter ballot is out of order until we approve it. The committee says, "and if approved, reference to letter ballot." I move that we reject that recommendation and do not approve it.

Mr. J. J. Hennessey: I feel that if we can make a change to have all the fillets uniform, it would be a nice thing, but we would not accomplish that in the next ten years. How long do some of the journals wear? You have your small fillets now, and in a short time all of us will be going to the large fillet, and the journal bearing at the rear end will have practically so little bearing it is not worthy of taking into account, and you are very liable to have hot bearings.

Mr. E. T. Millar (B. & M. R. R.): If we increase the fillet on the back end of our journals, and also do the same to our bearing, I can not see where we are going to have any trouble with our old axle. If we increase the radii of the bearing of our new fillet in the new axle, where can we have any trouble with the old axle in the small one?

Mr. F. M. Whyte (New York Central:) I understand from paragraph 23 that the bearings are not to be changed. Should there not be something in the letter ballot to cover the necessary change in radius to fit the axle? If the radius in the axle is changed, the radius of the bearing should be changed.

Mr. Muhlfeld: Referring to the remarks made by Mr. Millar, I will say that this recommendation applies to new axles and not to old axles. The old axles are taken care of, as the application would not be to them. The increase in radii applies to new axles.

Mr. Sanderson: This change recommended by the committee refers only to the 40,000 pounds capacity axles, so far as any important change is concerned. I do not think it is worth while to make any change, as the old cars are continually going out of commission and are going to the scrap heap. I think we should let the old practice continue, and take a vote and vote down the proposition that the change be made.

Mr. E. W. Pratt (C. & N.-W. Ry.): I believe that from the wording of the committee's suggestion that Mr. Wildin's motion is the only one in order.

The President: It is not seconded.

Mr. Hennessey: I will second Mr. Wildin's motion.

(The motion of Mr. Wildin was put to vote and was not carried.)

Mr. Seley: This leaves the committee in a quandary. Paragraph 29, regarding axles, requests approval of paragraphs 24 to 28 and if they are approved, reference to letter ballot of the changes suggested in paragraph 26. I would ask your pleasure as to the adoption of the recommendations of the committee in paragraphs 24 to 28, not including, however, the specific one in paragraph 25, which has been very thoroughly settled. I do that, in order to get consideration of Mr. Cromwell's recommendation that we change from the present method of joining the center lines of the axle, which the committee does not approve — they preferring the present arrangement.

The President: Is there any discussion on the committee's request?

Mr. H. A. Beaumont (B. & O. R. R.): I recommend that paragraphs 24 and 25 be approved as recommended by the committee and submitted to letter ballot.

Mr. Seley: There is no suggestion for a letter ballot on that.

Mr. Wildin: I move that the suggestions made by Mr. Cromwell in paragraph 24 be approved and the committee's recommendation rejected.

The President: It has been moved and seconded that the suggestion of Mr. Cromwell, as given in paragraph 24, be approved and the recommendations of the committee be rejected.

(The motion carried.)

The Secretary: It is understood that paragraph 24 only will be submitted to letter ballot.

Mr. Seley then read the report, from paragraphs 30 to 32.

Mr. Muhlfeld: Referring to paragraph 32, Mr. Whyte's suggestion is along the line of improvement, but instead of omitting the recesses as he proposes, I suggest that investigation be made as to a permissible redesign of the brake head, which, in combination with the present arrangement of hanger suspension, would prevent the brake-beam hanger from coming out of the recess in the event of the brake shoe or brake-shoe key becoming lost. I have seen brake heads fitted up in that manner, and they seem to have the required element to prevent the brake beams from coming down.

In view of the higher capacity freight equipment cars, the increased percentage of braking power and the more severe air-brake conditions in general, we think it advisable that a recommended practice section or bar, and a minimum allowable standard section of bar, be specified for brake-beam hangers and for their suspension bolts or pins.

The standard practice alternate brake head as shown on M. C. B. Sheet 8, allows the use of a hanger 1 inch in diameter, which will give a substantial allowance for wear, prevent liability for failures at the corner, and will restrict the vertical movement of the brake head on the hanger when brakes are set and released. We consider that the use of the 1-inch round section bar for brake hangers and pins should be recommended practice for new cars and that not less than ⅞-inch round section for bar and pin should be standard practice. It is also desirable to give free movement of the brake beam laterally in order to follow the wheels to the truck when curving, and that the design at the point of suspension to the column casting, or otherwise located fulcrum, shall be as shown on page 74 in the Proceedings of 1907.

Mr. Seley then read paragraphs 33 and 34.

MR. MUHLFELD: The Baltimore & Ohio has a considerable percentage of its freight equipment that is turned over for dumping at lake ports, and where there is liability for brake-shoe keys, center-plate pins and other parts that may be seated by gravity becoming misplaced or lost. We have found that by deviating somewhat from the M. C. B. dimensions of the brake-shoe key and lug opening that this provides for the wear of the brake-head lug openings, and prevents liability of the brake-shoe keys coming loose and dropping out when the cars are turned over for dumping. It might be well to give consideration to making this change in the standard brake shoe as it takes up the wear in the brake head, maintains the tightness of the brake-shoe key at all times, by which means we have overcome the loss of the keys.

In regard to the present limits of deflection for No. 1 and No. 2 brake beams, we consider the present limits sufficiently low. We have quite a number of 80,000 pounds capacity cars that come within the lesser weight, which would permit the use of the No. 1 brake beams, which would be too light.

MR. SELEY: I might say that Mr. Muhlfeld's recommendation, regarding the matter he has just specified, came to the Committee on Revision of Standards and Recommended Practice after the report was prepared and I have an appendix which includes all such matters, and with your permission I will read at this time the matter covering this particular point. It is as follows:

"(8) In view of the higher capacity freight equipment cars, the increased percentage of braking power and the more severe air-brake conditions in general, we think it advisable that a recommended practice section of bar and a minimum allowable standard section of bar be specified for brake-beam hangers and for their suspended bolts or pins. The standard practice alternate brake head as shown on M. C. B. Sheet 8, allows for the use of a hanger 1 inch in diameter, which will give a substantial allowance for wear, to prevent liability for failure at the corners, and which will restrict the vertical movement of the brake head on the hanger when brakes are set and released.

"We consider that the use of the 1-inch round section bar for brake hangers and pins should be recommended practice and that not less than ⅞-inch round section of bar and pin should be standard practice. It is also desirable to give free movement of the brake beam laterally in order to follow the wheels in the truck when curving and that the design at the point of suspension to the column casting, or otherwise located fulcrum, shall be as shown on page 74 in the Proceedings of 1907."

The committee would advise that if the suggestion to use 1-inch diameter material for brake hangers is accepted, it will be necessary to modify the standard-brake head, as the entrance to the hanger opening is 15-16 inch. Your committee is of the opinion that it might be well to modify this standard brake head so as to use 1-inch irons if desired, but not changing the recommended practice adopted last year that the brake-beam hanger shall be ⅞-inch diameter.

Your committee is not in favor of the curved bearing for the brake hanger as shown on page 74 in the Proceedings of 1907, and so stated last year, and was supported by the opinion of the convention.

In this connection cut Fig. 4 of the M. C. B. Sheet 8 was copied in error and should be removed from the plate.

The committee would add this to the sections under consideration.

THE PRESIDENT: What is your pleasure, gentlemen?

MR. SELEY: The question is the approval of the decision in general, and the recommendations in regard to paragraphs 38 and 39, which are very important as giving the M. C. B Association an opportunity to express their views on the necessity for standard-brake beams. I hope very much that these two paragraphs will go to letter ballot.

MR. GAINES: Regarding the matter of the standard size of brake-beam hangers, I think that is a pretty important question, and something we have never tackled before, and to crystallize sentiment in the matter, I move that the Committee on Standards, in proposing their other changes, submit to letter ballot the question of the adoption of a standard, and also the adoption of recommended practice for new cars, make the standard ⅞ inch and the recommended practice for new cars 1-inch, and if necessary change the drawings of the brake head to agree if it is adopted.

(This motion was put to vote and adopted.)

Mr. Seley: I have a letter from Mr. F. M. Nellis, Secretary of the Air Brake Association, which is somewhat lengthy, and which touches on some of the matters under consideration. It is as follows:

Chicago, Ill., June 13, 1908.

Mr. C. A. Seley, Mechanical Engineer, Rock Island System, Chicago, Ill.:

Dear Sir,— Replying to our previous correspondence on the subject of "Air Brake Coupling Heads," and the writer's promise to advise you promptly at the adjournment of the Air Brake Association convention in St. Paul, beg to submit information as follows:

A great deal of trouble has been experienced from the non-uniform practice of intermingling straight groove and taper groove rings and coupler heads in air-brake service. As the Air Brake Association's last year's proceedings showed, a great many rings have to be whitted and trimmed to fit the various heads. It would seem that a uniform coupling head, with respect to groove and packing ring, should be adopted.

Our members in the severely cold districts of Northern United States and Canada complain of very great annoyance from the leaks at the hose couplings of freight trains in winter time. This trouble is brought about by the hose freezing rigid, becoming practically stiff pipes for the time being, and breaking joint at the hose coupling when the slack of the train is taken. So great has this trouble become that on some of our Canadian roads the members report their inability to operate over a certain number of air brakes in the head end of the train. This is a hose trouble, and not a gasket and coupling head trouble. Most roads are using a lengthening nipple to moderate this trouble, but the frozen-hose trouble still remains.

In the 1905 Proceedings of the Air Brake Association you will find a very good treatise on "Leakage in Brake Pipes at the Coupling Heads," which is wholly due to the abnormal slack in the draft gear of the cars. The slack in some of these 35-car trains will aggregate 15 or 18 feet.

At the St. Paul convention, just adjourned, prominent mention was made of scrapping many old coupling heads which had evidently been in service ever since the adoption of automatic brakes on freight cars. This scrapping is objected to by some roads who believe that the coupling head should never wear out. One member stated that he found the gasket groove had been cleaned out so frequently that it was unduly enlarged and a standard gasket could not make a tight joint. Also the bearing portion of the tongue and groove of the couplings was so badly worn that the gasket would not set up high enough to make a tight joint. It seems that a great many hose coupling heads should be scrapped for the reasons just mentioned.

The Air Brake Association has made no systematic investigation of automatic air-hose couplings and is not in a position at this time to give any information on the same to your committee.

Trusting this may be of some assistance to you, I remain,

Yours very truly,

F. M. Nellis,
Secretary.

In view of this, therefore, the committee is without information regarding this point, and can only suggest this matter as a subject for special committee work if desired by the Executive Committee.

Mr. Seley then read the report down to and including paragraph 56.

Mr. Muhlfeld: In reference to paragraphs 48, 51, 53, 54 and 56, I think the location of the point of attachment of the chain to the barrel should be included. We find that that is a very important element in the winding the chain on the barrel and we have had some accidents on account of the chain not winding properly, due to the location of the point of attachment.

Referring to paragraph 51 we would move that the preparation of the proposed designs to cover standard brake shaft, brake wheel, brake-wheel fit, ratchet wheel, ratchet-wheel fit, and uniform methods for fastening the brake wheel, ratchet and chain to the staff and of methods for making repairs, be referred to a special committee. We would also move that that committee incorporate a recommendation covering the brake-shaft step, as the design and location of all these parts appear to us to be correlated and deserving of thorough and special investigation.

As to paragraph 53, we would recommend the elimination from Sheet M. C. B. 9 of the malleable iron truck lever connection and a specification that these be made of cast steel or of forged iron or steel, on account of the large number of accidents that have occurred due to the failures of these malleable-iron connections, more particularly in connection with the higher braking pressures.

In regard to paragraph 54, we believe that the standard 10-inch length of nipple at each end of the train pipe should be designated on M. C. B. Sheet 9 and that this nipple should be made of extra heavy pipe for new cars or for complete new train pipes. We find that the ordinary commercial pipe does not meet the requirements very well.

As to paragraph 56, there are quite a number of railroads where, on account of the length and percentage of grade, it is necessary to make use of hand brakes in combination with automatic brakes, when handling freight trains down grades, and of hand brakes for spotting and handling loaded and light cars at dumping machines and on trestles. It has been found that a ⅜-inch brake chain has proven unsatisfactory, and we would recommend that consideration be given to the use of a ½-inch brake chain and ⅝-inch bolt on certain freight equipment cars to be built after a specified date, and when renewals are made on cars now in service.

Mr. Whyte: I would ask what is intended by the use of the words "machine bolt" — whether a machine bolt is a rough, straight bolt?

Mr. Seley: That is the commercial designation of the ordinary square-headed bolt.

Mr. Gaines: I move an amendment to the committee's recommendation on this section, inasmuch as we should submit to letter ballot paragraph 49. It may not be possible to have the standard push rod on everything, but where we can use one, and work it in, I think it would be very desirable to do that. I make that as a motion.

(Motion was not seconded.)

Mr. William Forsyth (*Railroad Age-Gazette*): I move that a committee be appointed in accordance with Mr. Gibbs' suggestion to design a standard brake shaft, brake wheel, and brake-wheel fit, etc., referred to in paragraph 51, and to consider the matter of the increase of size of the brake chain, as referred to in paragraph 56.

The President: It is moved and seconded that the suggestion of Mr. Gibbs, as contained in paragraph 51, that a committee be appointed to present designs showing standard brake shafts, brake wheel and brake-wheel fit, etc., and that this committee consider the matters referred to in paragraph 56, be adopted.

Mr. Sanderson: I ask Mr. Forsyth if he will not include in that recommendation the matter in paragraph 53, as they should all go together?

Mr. Forsyth: I will accept that.

The President: The motion is, that the matter in paragraphs 51, 53 and 56 be considered by a special committee to report next year.

Motion carried.

Mr. Sanderson: I move that the recommendation of the committee with reference to paragraph 55 be approved and referred to letter ballot.

Motion carried.

Mr. Muhlfeld: With two sizes of chain, as referred to in paragraph 56, for certain cars there will always be a question as to right or wrong application. The ½-inch bolt is too light at the root of the thread.

Mr. Seley then read the report to paragraph 70.

Mr. Muhlfeld: In regard to paragraph 70 we would suggest in connection with the designing of standard arch bars and of column and journal-box bolts for 100,000 pounds capacity trucks, that the elimination of column-bolt washers be given consideration, and that the bolt holes in the top arch bar be countersunk for a corresponding fillet to the under side of the head of the column bolt. Any slight wear between the head of the column bolt and the top arch bar will not affect the strength of this compression member to such an extent as would involve renewal or safety. Furthermore, there will be adequate bearing surface between the under side of the head of the column bolt and the top arch bar to insure proper tightening of the bolt.

The Secretary: The noon hour has arrived, when the topical discussion should be taken up.

Mr. Whyte: I move that we continue the consideration of this subject.

Motion carried.

Mr. Seley read the report to paragraph 72.

The President: Gentlemen, what action will you take on the paragraphs just read?

Mr. Sanderson: I move that the recommendations of the committee with reference to paragraphs 71 and 72 be approved and referred to letter ballot.

(Motion carried.)

Mr. Seley read to paragraph 74.

Mr. Muhlfeld: In connection with the subject of standard pipe unions, I may say that ball and joint unions are coming into [illegible] on cars pretty generally and we find such unions as manufactured by the different makers have different sizes of nipples, [illegible] pieces and coupling nuts. We think this is a subject which should be gone into in connection with the union already adopted as standard practice, to determine upon dimensions which will secure interchangeability of the ball seat or non gasket union parts.

The Secretary: This will be considered by the Executive Committee when it formulates the program for the next meeting unless there is a motion made.

Mr. Muhlfeld: I make a motion to cover these suggestions.

The motion was seconded by Mr. McIntosh and carried.

Mr. Seley read the report to paragraph 83.

Mr. Sanderson: I move that the recommendation contained in paragraph 83 be approved and submitted to letter ballot. (Motion carried.)

Mr. Seley read the report to paragraph 88.

Mr. R. L. Kleine: I move that the recommendations contained in paragraphs 87 and 88 be approved and submitted to letter ballot. (Carried.)

Mr. Muhlfeld: I would ask what is meant by the brakestaff bow? I do not understand what it means.

Mr. Seley: That is a carrier with a complete U, with a fastening on both sides, instead of the L-shaped bow which was formerly shown on some drawings. It is the bow that holds the lower end of the brake staff and is U shaped and fastened on both sides.

Mr. Seley read to paragraph 90.

Mr. Muhlfeld: If paragraph 90 refers to the air-brake defect card, I suggest that consideration be given to including under "N" "Air-brake cleaning out of date." That is to say, air-brake equipment that has not been cleaned or oiled the twelve-months period. I make a motion to cover this.

The Secretary: I will say that that will be fixed up for the Rules of Interchange.

Mr. Muhlfeld: That is where it properly belongs.

Mr. Seley read the report to paragraph 101.

The Secretary: It is hardly necessary to submit the m in paragraph 101 to letter ballot. If there is no objectio Secretary will simply change the heading as referred to [illegible] Mr. Gibbs.

Mr. Cromwell: I move the Secretary be authorized to make that change. (Carried.)

Mr. Sanderson: Before Mr. Seley proceeds further with the report, I wish to refer back to paragraph 95, which I think should be acted on. I move that the Secretary be instructed to make the correction on the drawing referred to in paragraph 95.

The Secretary: That is an error and will be corrected.

Mr. Seley: I have an appendix to our report, which is as follows:

APPENDIX TO REPORT OF STANDING COMMITTEE ON REVISION OF STANDARDS AND RECOMMENDED PRACTICE.

*To the **Members**:*

(1) Since the report of the committee was prepared and printed the following matters have been sent to the committee for consideration:

(2) Mr. Muhlfeld, of the B. & O., suggests: "Plate 9 shows the lever pins at 1 3-32 inches in diameter. It is not practicable to use a pin

1 3-32 inches in diameter in a 1 3-32-inch hole for this class of work. We would suggest that the lever-pin holes be made 1⅛ inches in diameter and to be made straight by drilling, reaming or broaching true to that size."

Your committee considers that this matter is already properly covered, and if the lever-pin hole gauge, as shown on Sheet M. C. B. 22, is used, the pin holes will be of proper diameter.

(3) "From experience with combination air and hand braking of heavy capacity freight cars on long, steep mountainous grades, we have found that the ⅜-inch straight link chain is liable to failure, and we consider that ½-inch straight link chain should be made a standard for hand-brake chain."

Your committee does not approve the above suggestion and refers to paragraph 56 of their report.

(4) "Sheet M. C. B. 19, Diagram A-1. From examination of a large number of house cars, we find in many instances the application of two horizontal instead of one grabiron over the sill step which is made necessary to enable the trainmen to right themselves after mounting the step. It is our opinion that one vertical grabiron located similar to the one indicated with the dotted lines on Diagram A-5 and to the vertical solid lines on Diagram A-6 is the proper arrangement and enables a greater range in the vertical height to enable the trainmen to mount the sill steps and also to secure a handhold when running alongside the end of a moving car, especially at night, for the purpose of operating uncoupled lever.

"In view of the fact that the rules for the inspection of safety appliances and for the procuring of evidence of violations of the safety appliance laws, as issued by the Interstate Commerce Commission, September 1, 1907, already involves the Master Car Builders' standard practices to the extent of items 7, 9-A, 9-B, footnote 'B' to defects in couplers and parts and footnote 'A' to defects in handholds, etc., and that legislation may involve the M. C. B. standards for the protection of trainmen to such an extent as will make them a part of the law, we would suggest that all diagrams and rules pertaining to the same shall be given careful consideration for the purpose of making them as nearly practical and correct, as well as flexible to meet all conditions, as may be possible.

"By comparing the diagrams and the rules pertaining to the same with each other, as well as with the actual service conditions, it will be noted that there is a lack of consistency. For instance, the third cut of diagram 6 shows the lower end of the vertical grabiron resting on the top of the floor, whereas the rule requires that it should be about 6 inches above the floor of the car. In a case of this kind we would suggest that the rule read as follows: The lower end of vertical side grabiron should be located near the floor of the car.

"Also referring to the lower end view of diagram 5 the general rule pertaining to handholds of grabirons states that end-sill grabirons may be from 18 inches to 24 inches. On cars where permanent safety chains are applied we have found it necessary to make these grabirons as short as 15 inches in length in order to apply the same between the safety chain bracket and push-pole pocket. We, therefore, consider that in a case of this kind the rule should state that end-sill grabirons may be from 12 inches to 24 inches long in order to meet the practical conditions. The rules also require that horizontal grabirons on the ends and sides of cars be located not less than 18 inches or not more than 30 inches from the center line of the coupler. We are of the opinion that these dimensions should be changed to make the maximum not more than 36 inches instead of not more than 30 inches.

"We also consider that everything possible, more especially with respect to unnecessary dimensions, should be eliminated from the diagrams, and that the rules or text and the reference in the same to dimensions should be made as brief and flexible as practicable.

"We are transmitting under separate cover copy of Baltimore & Ohio blue-print from tracing 22124-A, indicating more especially with respect to the text, the manner in which we consider the revision should be condensed. While this drawing incorporates the M. C. B. practice, you will note that we have eliminated some of the inconsistencies as between the diagrams and the text, and we have also added to diagram A-1 the vertical grabiron, which is not in accordance with M. C. B. standard practice, for the reason that we have found it necessary and advisable to go to the use of the same on account of complaints from trainmen."

The matter of standards for the protection of trainmen has been referred to a special committee (see paragraph 63 of the report).

(5) "We consider that the turned-up lip on ends of the tie bars should be continued. This applies more especially in view of the more extended use of the inside brakes and to the heavy capacity freight equipment cars where the allowable lading runs from 100,000 to 125,000 pounds, and where, if the lip is not applied, the tendency is to wear the holes in the tie bar as well as the threads on the journal box bolts."

This recommendation is not approved, and the present form of tie bar was approved by letter ballot last year by a vote of 1,570 as against 207.

(6) "Our position is that a cotter as applied to a column bolt does not amount to anything whatever as a matter of safety. If it is proposed to make use of a single nut without a nut lock, then a substantial split flat key should be specified.

"Where the brake-beam hanger is suspended to the column casting or otherwise located fulcrum in the manner shown on page 74 in the Proceedings of 1907, that the ears to the fulcrum take the lateral stress, whereas, when the limbs of the brake-beam hangers are placed outside of a central fulcrum, there is a continual stress on the head and nut key of the hanger bolt or pin and which tends to loosen or shear the same and result in loss or failure of parts.

"We consider that column bolt washers may be omitted if the bolt holes in the top arch bars are countersunk for a corresponding fillet to the under side of the head of the column bolt. Any slight wear between the head of the column bolt and the top arch bar will not affect the strength of this compression member to such an extent as would involve renewal or safety. Furthermore, there will be adequate bearing surface between the under side of the head of the column bolt and the top arch bar to insure proper tightening of the bolts."

The committee has already suggested reference to a special committee on matters of this kind. (See paragraphs 67 to 70 of the report.)

(7) "We are in favor of permitting the clearance limits of the various railroads to govern as to the height from the rail to the top of the brake staff. On the Baltimore & Ohio, where the height of the house cars are materially restricted due to tunnel and other clearances, the maximum height from the rail to the top of brake staff is 13 feet 11 inches. However, where special cars must be used for certain commodities, this dimension would be impractical and we, therefore, do not favor the restriction."

Your committee does not favor this suggestion, as the action of last year was adopted by a very large majority and was for the information of the American Railway Association.

"(8) In view of the higher capacity freight equipment cars, the increased percentage of braking power and the more severe air-brake conditions in general, we think it advisable that a recommended practice section of bar and a minimum allowable standard section of bar be specified for brake-beam hangers and for their suspended bolts or pins. The standard practice alternate brake head as shown on M. C. B. Sheet 8, allows for the use of a hanger 1 inch in diameter, which will give a substantial allowance for wear, to prevent liability for failure at the corners, and which will restrict the vertical movement of the brake head on the hanger when brakes are set and released.

"We consider that the use of the 1-inch round section bar for brake hangers and pins should be recommended practice and that not less than ⅞-inch round section of bar and pin should be standard practice. It is also desirable to give free movement of the brake beam laterally in order to follow the wheels in the truck when curving and that the design at the point of suspension to the column casting, or otherwise located fulcrum, shall be as shown on page 74 in the Proceedings of 1907."

(9) "In view of the cars that are now marked 100,000 pounds capacity having allowable overloads ranging from ten to twenty-five per cent, it has been found that the impacts and stresses transmitted to the unspring-borne parts of the truck, due to the truck bolster springs running solid, has a very destructive effect, more especially when traversing indifferent track conditions at high rates of speed. We would suggest that consideration be given to the design of a spring that will be suitable for 120,000 pounds capacity cars with arch-bar trucks, making use of 5½ by 10 inch journal axles and other parts interchangeable with the usual designs

for 100,000 pounds capacity cars, in order that a more suitable spring would be available for minimum light and maximum loaded weight of cars that are now marked 100,000 pounds capacity, but where the allowable overload may be as high as twenty-five per cent due to transportation and traffic requirements.

"From tests made on locomotive tenders on this railroad and from experience with foreign freight cars operating over this line, which have been equipped with cast-steel truck side frames of various designs, there have been quite a number of failures which, while due to some extent to inherent deficiencies in design and material, have been contributed to by shock that would not have occurred had there been adequate spring resistance to the load. With the arch-bar type of trucks there is a certain amount of flexibility, but with the truck side frames such as those made of cast steel, the lack of flexibility increases the liability for fracture on account of impact and shock which can be expected from ordinary service conditions."

The committee would recommend that this be referred to a special committee to ascertain the necessity for additional higher capacity springs, and to propose designs if necessary.

(10) "We would recommend the elimination from Sheet M. C. B. 9 of the malleable iron truck lever connection and specify that this be made of cast steel or of forged iron or steel. We have had a great many accidents due to failures of these malleable iron connections."

This suggestion was made last year and not approved. (See paragraph 76, page 79, 1907 Proceedings.)

(11) Mr. John McE. Ames, of the American Car & Foundry Company, suggests a change with reference to flooring on Sheet M. C. B. 24, the table of dimensions to read as follows:

A........	5 "	6 "	7 "	8 "	9 "	10 "
a........	4¾"	5¾"	6¾"	7¾"	8¾"	9¾"
b........	4¼"	5¼"	6¼"	7¼"	8¼"	9¼"
c........	4¼"	5¼"	6¼"	7¼"	8¼"	9¼"

This is in line with the recommendation under paragraph 71 of the report and which has the approval of the committee.

(12) Mr. W. R. McKeen makes the following suggestion:

"M. C. B. Sheet 9, Dead and Live Lever, has the following note and an arrow head to the center hold only: 'Not less than 1 3-32 inches nor more than 1⅛ inches,' while on cylinder lever, floating lever, floating-lever bracket, dead-lever guide, truck-lever connection, and connecting rods, diameter of holes is given as 1⅛ inches. Would suggest omitting diameters of holes on the above, and add in large type the following: 'All holes for brake pins not less than 1 3-32 inches diameter, not more than 1⅛ inches diameter.'"

The committee would approve this suggestion.

(13) Mr. A. Gibbs, of the Pennsylvania Railroad Company, suggests: "We are experiencing a number of accidents to trainmen resulting from brake staffs failing in the weld, not only on repaired cars, but in some instances on new cars built for individuals by freight car builders. This matter has become so serious that we deem it necessary to call the same to your attention as chairman of the Committee on Standards, with a suggestion that a requirement be placed in the standards that no brake shafts shall be welded."

The committee would approve this suggestion, except to recommend that it be placed among the Recommended Practice, at least for the present.

CHICAGO, ILL., June 2, 1908.

MR. E. W. PRATT: I move that the recommendations of the committee be adopted as to the appointment of committees and submitting questions to the letter ballot.

The President put the motion, which was unanimously carried.

THE PRESIDENT: The next report on the program is that of the Standing Committee on Tests of Triple Valves. The chairman is Mr. A. J. Cota. As Mr. Cota is not present, Mr. Pratt will present the report.

Mr. Pratt read the report of the Committee on Triple Valve Tests.

REPORT OF COMMITTEE ON TRIPLE VALVE TESTS.

To the Members:

Your Committee on Triple Valve Tests wishes to report that the new 100-car, 10-inch, brake-cylinder testing rack has been built and shipped to Purdue University at Lafayette, Indiana, and that the material is now stored awaiting the completion of a room that is being especially built for housing the test rack. We are informed by the Purdue authorities that this building will be completed about June 20.

The Triple Valve Committee, to whom the duties were assigned of revising the code of tests for triple valves, wishes to report that until the new rack is installed and valves furnished for testing or for use in tests it will be unable to revise the code. During the past year a new design of triple valve has come out, which your Committee is assured will be presented for test later on.

A. J. COTA, Chairman,
R. K. READING,
E. W. PRATT,
F. H. SCHEFFER,
D. C. ROSS,
Committee.

CHICAGO, ILLINOIS, May 19, 1908.

THE PRESIDENT: This is a report of progress of the Standing Committee on Triple Valve Tests. I do not know that there is any other action necessary than to receive the report.

MR. MUHLFELD: Does this committee look into the item of efficiency or the test to be applied?

THE SECRETARY: That is prescribed by the M. C. B. code of tests.

MR. SANDERSON: I move that the report of the committee be received and spread upon the records of the convention.

Motion seconded and carried.

THE PRESIDENT: The next report is of the Standing Committee on Brake Shoe Tests. Dean Goss is chairman of the committee.

Dean Goss here read the report on Brake Shoe Tests.

REPORT OF THE STANDING COMMITTEE ON BRAKE SHOES.

To the Members:

1. FRICTIONAL QUALITIES OF SHOES SUBMITTED BY RAILWAY COMPANIES.— The undersigned, your Committee on Tests of Brake Shoes, would report that during the past year five shoes have been submitted by railway companies. Four were sent by Mr. J. F. Walsh, representing the Chesapeake & Ohio Railway Company, and one was sent by Mr. William Garstang, representing the Cleveland, Cincinnati, Chicago & St. Louis Railway Company. These shoes were tested for frictional qualities under the specifications of the Association. The C. & O. shoes were tested upon a cast-iron wheel only, while the C. C. C. & St. L. shoe was tested both upon a cast-iron and a steel-tired wheel. Three of the five shoes tested upon a cast-iron wheel more than met all the requirements of the Association's specifications; two failed to do so. The one shoe tested upon a steel-tired wheel proved satisfactory so far as the mean coefficient of friction is concerned, but developed an abnormally high rise in the coefficient of friction at the end of the stop. The description of these shoes and a detailed statement of results obtained from them will be found presented as Appendix I accompanying.

2. WEARING QUALITIES OF SHOES SUBMITTED BY RAILWAY COMPANIES.— The four shoes submitted by Mr. Walsh were subjected to a wearing test under a program similar to that employed by your Committee

in its preliminary investigations which were reported last year. An outline of the method employed and a statement of the results obtained from these shoes constitute a part of Appendix I already referred to. In reporting these results, your Committee reminds the Association that as yet there is no specification governing tests of wearing qualities. The significance of the data must be judged in the light of the more elaborate discussion of tests to determine wearing qualities, which follows:

THE RESEARCHES OF THE YEAR.

3. A Review of the Work of Past Years.— It will be remembered that the Association has definite specifications covering the frictional qualities of brake shoes, and that the work of the Committee, during recent years, has been confined to testing shoes under these specifications. The effect of this work has been to stimulate interest in the brake-shoe problem, and to make of record information concerning the action of shoes on both cast-iron and steel wheels. The fact that your Committee has reported that most shoes recently tested have met the requirements of the Association's specifications, may be accepted as evidence that its work has been effective in improving the friction of shoes sold to railway companies. Two years ago your Committee called attention to the need of information concerning the wearing qualities of brake shoes, and under authorization from the Executive Committee, initial steps were taken to establish tests which would serve as a measure of wear. Proceeding, your Committee's report of last year was devoted almost exclusively to a discussion of methods and to the presentation of results obtained from fifteen different shoes when exposed to wear under a definite program. The results, which were obtained by exposing the shoe to wear under a single set of conditions only, showed great variation in the wearing qualities of the several shoes tested. In presenting them, their value as a measure was frankly questioned as will be seen from the following quotation: "Whether the relative results would be the same had the conditions of test involved lighter pressure or higher speeds than those which were actually employed, is a question which the Committee has not yet had time to determine. It is not impossible that a shoe giving a relatively poor performance under the conditions of the test, would show relatively better under some other conditions. If, for example, shoes are designed for specified service, it would perhaps be unfair to expect all to show at their best under a single condition of operation." The purpose of your Committee during the present year has been to throw light upon the question raised by the statements quoted. To this end arrangements were entered into with the authorities of Purdue University to extend the work along the lines of last year's investigations. Out of the fifteen shoes dealt with in last year's report, there were nine presenting sufficient material to serve under the program of the present year. These shoes are described and illustrated in the

report of last year. A summary of their description is given herewith as Table I.

To perfect the record and especially in response to suggestions made upon the floor of the convention last year, your Committee presents herewith, as Appendix III, a statement of the chemical composition of the shoes worked upon this year.

TABLE I.
SHOES TESTED

Number of Shoe	Railway Company Submitting Shoe.	Marking on Shoe	Material in Shoe.
158	Hocking Valley R.R.	S. 1 F Streeter	Soft iron with hard insert.
161	Hocking Valley R.R.	◇S	Soft iron with hard insert.
163	A.T. & SF. R.R.	B x U 36 Pat. 2F 2D 1900	Hard iron with hard corrugated insert
172	A.T. & SF. R.R.	6-79-B	Soft iron with 7 hard circular inserts
179	W. & L.E. R.R.	Pittsburg B.R. Shoe Co.	Malleable iron back composition filler
183	D.M. & N. R.R		Pressed steel back composition filler
194	L.S. & M.S. R.R.	C & NW 8386	Medium hard iron with 7 hard rectangular inserts
200	L.S. & M.S. R.R.	Streeter	Soft iron with hard insert
205	L.S. & M.S R.R	P C P G 3960 Pat. 4-11-93	Soft iron with no insert

NOTE:— The term soft as here used applies to iron which can be easily drilled.

4. THE SCHEDULE OF TESTS.— Each of the nine shoes described have been tested both upon a cast-iron wheel and upon a steel-tired wheel; first, when applied under a lighter pressure than that employed last year, and second, when applied under a heavier pressure than that employed last year. Also since the tests last year were upon cast-iron wheels only, the program of that year has been repeated upon the steel-tired wheel. In the actual working out of the program, each shoe was tested under a normal pressure of 1,080 pounds and 4,152 pounds on a cast-iron wheel, and under pressures of 1,080, 2,808, and 4,152 pounds on a steel-tired wheel. The cycle,

as controlled by Gear B, was used for the tests under pressures of 1,080 and 2,808 pounds, and that, as controlled by Gear A, was used for the heaviest pressure, 4,152 pounds, this change being necessary to give the shoe sufficient time to cool between applications. When the cycle is controlled by Gear A, the shoe is in contact with the wheel during 150 revolutions, and is out of contact during the succeeding 1,450 revolutions, the shoe being applied once during each 1,600 revolutions of the wheel. When the cycle is controlled by Gear B, the shoe is in contact with the wheel during 190 revolutions, and is out of contact during the succeeding 610 revolutions, the shoe being applied once for each 800 revolutions of the wheel. The speed in all cases was equivalent to twenty miles an hour. A detailed description of the methods and of the results will be found in the report submitted by the authorities of Purdue University, which constitutes Appendix II of this report. A summary of results is presented graphically by Figs. 1 and 2.

5. CONCLUSIONS CONCERNING WEARING QUALITIES may be drawn from results presented as follows:

(a) The shoes tested present great variation in the wearing qualities, the ratio between the poorest and the best shoe being as great as 1 to 4.

(b) The relative resistance to wear exhibited by different shoes is somewhat affected by the severity of the application. Of a series of shoes, the one which suffers least from wear at light pressures may not be the one which suffers least under a heavy pressure. Variations of this sort are, however, of small value, and if standards of performance are not too minutely defined, they may be neglected.

(c) Within limits employed by the Committee, whatever may be the pressure, the results clearly distinguish between the slow wearing and the rapid wearing shoe.

(d) All shoes tested wear more rapidly on a steel-tired wheel than on a cast-iron wheel. In general terms it may be said that for the absorption of a given amount of work, the wear upon steel-tired wheels is twice as rapid as upon cast-iron wheels.

(e) The results attest the value of the insert shoe. The work of this year was chiefly confined to shoes of this type because the solid shoes had been worn out by the tests to which the series had previously been subjected. (For facts concerning solid shoes, see report of 1907.)

(f) It is noteworthy that the four shoes showing least wear, 158, 163, 194 and 200, on both steel and cast-iron wheels, are all insert shoes, and that all practically meet the Association's specifications as to frictional qualities. (For statement of frictional qualities, see report of 1906.)

6. CONCERNING LIMITS OF ALLOWABLE RATE OF WEAR IN BRAKE SHOES.— It is not the purpose of your Committee to attempt at this time to frame a specification governing the wearing qualities of brake shoes, though the data presented seems to supply a satisfactory basis for such a

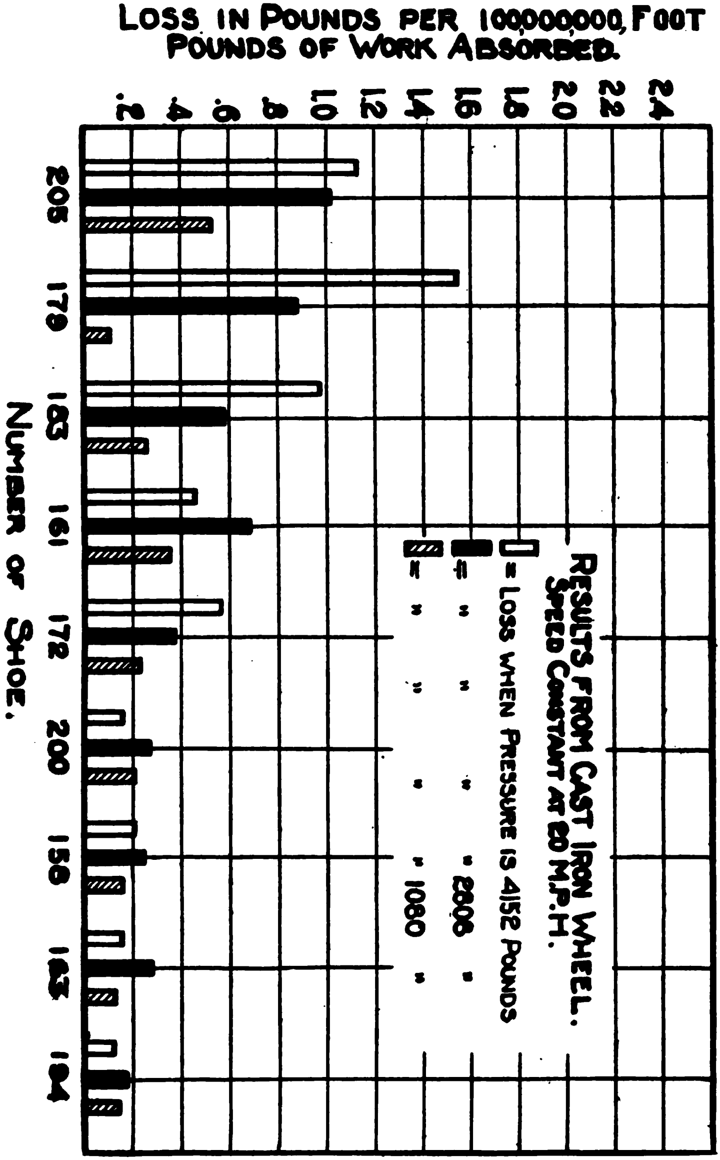

LOSS IN POUNDS PER 100,000,000, FOOT POUNDS OF WORK ABSORBED.
.2
.4
.6
.8
1.0
1.2
1.4
1.6
1.8
2.0
2.2
2.4
RESULTS FROM CAST IRON WHEEL.
SPEED CONSTANT AT 20 M.P.H.
= LOSS WHEN PRESSURE IS 4152 POUNDS
= " " " " 2606 "
= " " " " 1080 "
205
179
183
161
172
200
156
163
164
NUMBER OF SHOE.

FIGURE 1.

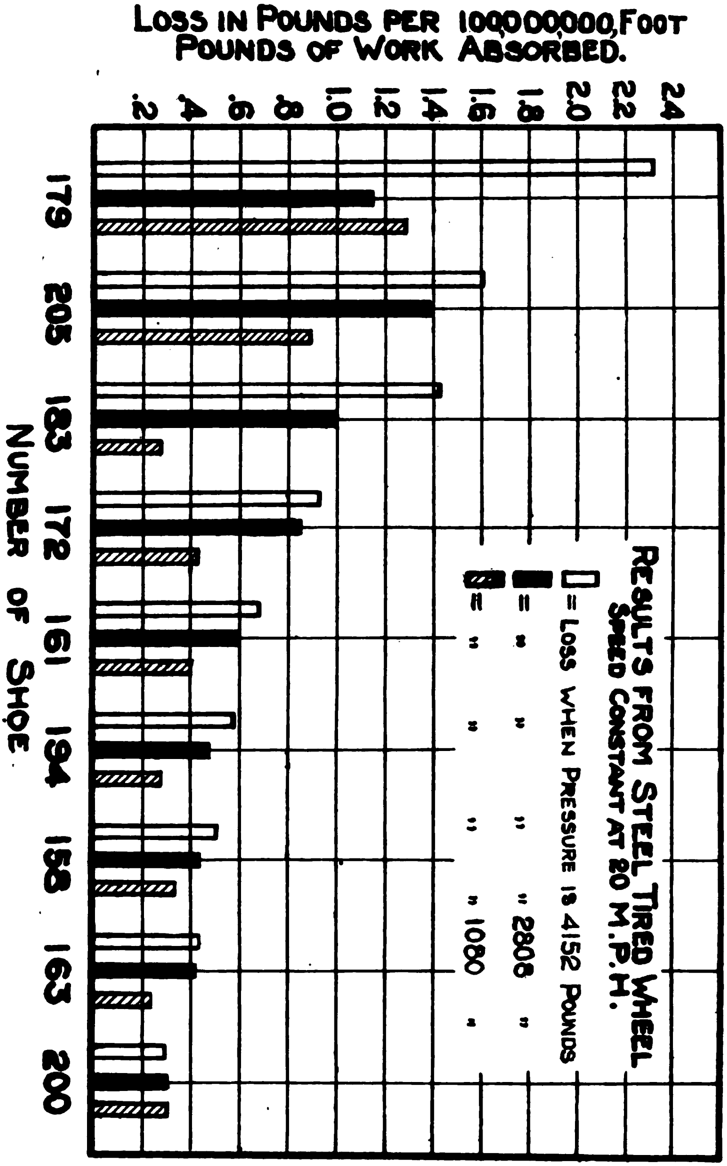

LOSS IN POUNDS PER 100,000,000, FOOT POUNDS OF WORK ABSORBED.
.2
.4
.6
.8
1.0
1.2
1.4
1.6
1.8
2.0
2.2
2.4
179
205
183
172
161
194
158
163
200
NUMBER OF SHOE
RESULTS FROM STEEL TIRED WHEEL
SPEED CONSTANT AT 20 M.P.H.
□ = LOSS WHEN PRESSURE IS 4152 POUNDS
■ = " " " " 2808 "
▨ = " " " " 1080 "

FIGURE 2

procedure. We suggest, however, as a matter for further deliberation, the following qualifications:

(a) That tests designed to determine the wearing qualities of brake shoes be run under a constant brake shoe pressure of 2,808 pounds.

(b) That the cycle of operation be 1,600 revolutions, 150 revolutions being with the shoe in contact with the wheel, and 1,450 being with the shoe in release.

(c) That the peripheral speed of the test wheel be twenty miles an hour.

(d) That under the conditions stated, a shoe should develop for each pound of metal worn away, 350,000,000 foot-pounds of work in contact with a cast-iron wheel, and 200,000,000 foot-pounds of work in contact with a steel-tired wheel.

A specification framed along these lines would pass four out of the nine shoes tested for service on both cast-iron and steel-tired wheels.

7. FUTURE WORK.— Your Committee believes that the work of the present year leaves two questions open which should be settled beyond doubt before a specification governing wearing qualities should be adopted. These are: (1) A confirmation of the general conclusions based upon the work of the present year; and (2) investigations which will disclose the effect of different brake shoes upon the wheel. With reference to the confirmation of the results of the present year, it would seem wise that not less than fifteen newly selected representative shoes be tested, the program of operation being identical with that employed this year. The results of such tests added to those now available would give a volume of data sufficient to permit limits to be set defining performance, which would be safe and reasonable. The importance of determining the effect of the shoe upon the wheel becomes apparent when one considers the possibility of a shoe showing a high resistance to wear, which may, in fact, be protected at the expense of wear upon the wheels. In discussing this matter last year, your Committee expressed its regret "that no measure has yet been made which will disclose the wear of the wheel under the influence of the shoe." To secure such a measure, it will be necessary to have a balance of sufficient capacity to weigh the wheel and of such delicacy as to indicate differences of weight as small as 1-500 part of a pound. No such balance is now available at the laboratory.

8. ACKNOWLEDGMENTS.— Your Committee has pleasure in acknowledging the interest taken in its work by Prof. C. H. Benjamin, Dean of the Schools of Engineering of Purdue University, by Prof. L. E. Endsley of that institution, who has been concerned with the immediate supervision of the work of the laboratory, and by the Griffin Wheel Company, represented by the vice-president and secretary, Mr. George F. Griffin, who, responding to the request of the chairman of the Brake Shoe Committee,

generously consented to make, without cost, analyses of such samples of brake shoe material as might be submitted to them by your Committee. It is through the coöperation of this company that the facts presented in Appendix III have been obtained.

Respectfully submitted,

W. F. M. Goss, Chairman,
George W. West,
B. D. Lockwood,
Committee.

Urbana, Ill., May 19, 1908.

APPENDIX I.

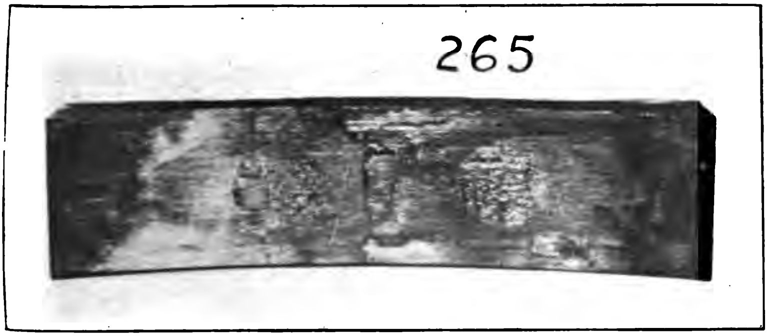
TESTS FOR RAILROAD COMPANIES.

APPENDIX I.—TESTS FOR RAILROAD COMPANIES.

During the past year five shoes have been submitted for test; four by the Chesapeake & Ohio Railway Company, represented by Mr. J. F. Walsh, and one by the Cleveland, Cincinnati, Chicago & St. Louis Railroad, represented by Mr. William Garstang. The former were assigned laboratory numbers 265, 266, 267 and 268, and the latter laboratory number 272.

A description of the several shoes is as follows:

Shoe No. 265 as received was new, never having been in service. Its dimensions are: length on arc, 13½ inches, width, 3⅜ inches, and thickness, 1⅝ inches. There are five inserts in the shoe equally spaced along its face and consisting of material so hard that an ordinary drill could be made to pass through them only after much effort. The body of the shoe is of soft material and has a reinforced back. A photograph of the shoe taken after the tests is shown as Shoe 265.



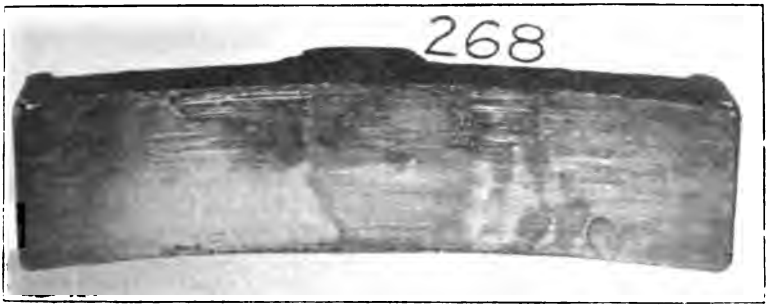
Shoe No. 266 had never been in service prior to its receipt at the laboratory. Its length along the arc is 13½ inches, its width 3⅜ inches, and its thickness 1½ inches. The shoe is of material soft enough to be easily drilled and contains no insert. It has a reinforced back. A photograph of the shoe taken after the tests is shown as Shoe 266.

266

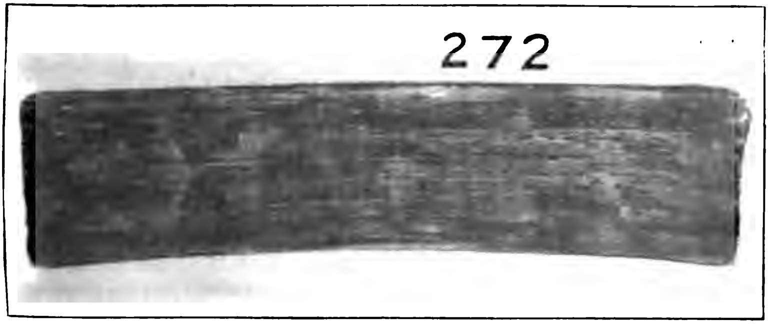
Shoe No. 267 was new and unused when received. The markings on the back are "Pat. 4 11 93 K." Its dimensions are: length along arc 14 inches, width 3⅜ inches, and thickness 1⅝ inches. It is of soft material easily drilled and contains no insert. The shoe has a reinforced back. A photograph of the shoe taken after the test is shown as Shoe 267.

267

Shoe No. 268 was new and unused when received. The markings on the back are: "Pat. 4 11 93 K." Its length along the arc is 14 inches, its width 3⅜ inches, and its thickness 1⅝ inches. The shoe contains no insert and is made of soft material which can be easily drilled. It has a reinforced back. A photograph made after the tests is shown as Shoe 268.



Shoe No. 272, prior to its receipt at the laboratory, had been in service on a passenger car. The marking on the back of the shoe is "1 G 4 C 2." Its length along the arc is 15 inches, its width 3¾ inches, and its thickness 1⅛ inches. The shoe has a reinforced back. The face of the shoe is of soft material, easily drilled and contains no insert. A photograph of the shoe is shown as Shoe 272.



The Master Car Builders' brake shoe testing machine at the laboratory of Purdue University was used in making the tests, the results of which appear in Tables 1, 2, 3, 4 and 5.

The results of the friction tests show that the coefficient developed by shoes 267, 268 and 272 on the cast-iron wheel satisfies the requirements of the Master Car Builders' specifications and that shoes 265 and 266 develop the specified action only when the brake pressure is 6,840 pounds. The rise in coefficient of friction at the end of the stop does not exceed the maximum value permitted by the specifications except in the case of shoes 265 and 266, and shoes 268 and 272. The rise in coefficient for the two former is greater when the pressure is 2,808 and 4,152 and the two latter when the pressure is 2,808.

TABLE I.

Coefficient of Friction upon Cast-iron Wheel from an Initial Speed of 40 Miles per Hour.

Brake Shoe Pressure.	COEFFICIENT OF FRICTION					
	Required by Specifications.	Developed by Shoe No. 265.	Developed by Shoe No. 266.	Developed by Shoe No. 267.	Developed by Shoe No. 268.	Developed by Shoe No 272.
2808	22	19.5	19.7	26.2	24.4	24.7
4152	20	18.1	17.0	23.7	22.6	22.8
6840	16	16.7	16.1	20.8	20.2	21.4

TABLE II.

Rise in Coefficient of Friction at End of Stop. Cast-iron Wheel. Initial Speed 40 Miles per Hour.

Brake Shoe Pressure	RISE IN COEFFICIENT OF FRICTION.					
	Max. Permitted by Specifications.	Developed by Shoe No. 265.	Developed by Shoe No. 266.	Developed by Shoe No. 267.	Developed by Shoe No. 268.	Developed by Shoe No. 272.
2808	7	7.4	9.9	6.6	8.2	8.2
4152	7	7.6	8.6	6.5	6.7	5.6
6840	7	3.1	6.1	6.0	6.7	3.9

Only one shoe, No. 272, was tested on a steel-tired wheel. It developed the required coefficient of friction at all brake pressures, but, except when the pressure was 6,840 pounds the rise in coefficient of friction was greater than the maximum permitted by the specifications.

TABLE III.

Coefficient of Friction upon Steel-tired Wheel from an Initial Speed of 65 Miles per Hour.

Brake-Shoe Pressure.	COEFFICIENT OF FRICTION.	
	Required by Specifications.	Developed by Shoe No. 272.
2808	16	16.7
4152	14	14.7
6840	12	14.2

TABLE IV.

Rise in Coefficient of Friction at the End of the Stop. Steel-tired Wheel. Initial Speed 65 Miles per Hour.

Brake-Shoe Pressure.	RISE IN COEFFICIENT OF FRICTION.	
	Maximum Permitted by Specifications.	Developed by Shoe No. 272.
2808	7	11.2
4152	7	9.2
6840	7	6.0

In addition to the regular frictional tests, shoes 265, 266, 267 and 268 were submitted to a wearing test. The method of determining the wearing qualities of these shoes was similar to that described in the Master Car Builders' Proceedings for 1907. The conditions of the tests were as follows:

Diameter of test wheel, inches	33
Material of test wheel	cast iron
Revolutions per cycle	800
Revolutions in each cycle during which the shoe has contact with wheel	190
Revolutions in each cycle during which the shoe is not in contact with the wheel	610
Brake shoe pressure, pounds	2,808
Revolutions per minute	204
Speed, miles per hour	20
Approximate time during which shoe has contact with wheel, minutes	1
Approximate time during which shoe has contact with wheel, minutes	3

The results of the wearing tests are given in Table V.

TABLE V.

WEAR OF SHOES ON CAST-IRON WHEEL.

Speed constant at 20 miles per hour. Pressure of shoe on wheel, 2,808 pounds. Revolutions of wheel during application, 190. Equivalent distance run during application, 1641.5 feet.

Laboratory No.	Coefficient of friction.	Weight of Shoes, pounds.	Number of Applications.	Total loss of weight, pounds.	Loss of weight per application, pounds.	1,000,000 feet pounds of work absorbed per application.	1,000,000 feet pounds of work absorbed per pound of metal lost.
I	II	III	IV	V	VI	VII	VIII
265	19.5	21.488	90	.496	.005511	.901	163.5
266	19.7	20.950	90	.532	.005911	.907	153.4
267	26.2	24.290	90	1.262	.014022	1.208	86.2
268	24.4	23.962	90	1.504	.016711	1.126	67.3

APPENDIX II.

THE YEAR'S RESEARCH.

TESTS TO DETERMINE WEARING QUALITIES.

LAFAYETTE, IND., April 27, 1908.

The Committee on Tests of Brake Shoes, Master Car Builders' Association:

GENTLEMEN,— In response to the direction of your Committee, tests have been made at the Engineering Laboratory of Purdue University to determine the wearing qualities of brake shoes under different pressures. Nine shoes, selected by Dr. W. F. M. Goss of your Committee, were tested.

The tests were under the immediate charge of Professor Endsley, whose report setting forth the results I submit herewith. The figures have been checked by Professor Ludy of the Department of Mechanical Engineering.

Respectfully submitted,

(Signed) C. H. BENJAMIN.

April 27, 1908.

Dean C. H. Benjamin, Schools of Engineering, Purdue University:

DEAR SIR,— I submit herewith a report of tests of brake shoes made for the Brake Shoe Committee of the Master Car Builders' Association:

THE TESTS were made upon the Master Car Builders' brake-shoe testing machine, a description of which will be found in the Proceedings of the Association for 1894 and 1906. The Proceedings for 1894 contain a description of the machine as used in finding the coefficient of friction, while those of 1906 give a full description of a mechanism which was applied to the original machine whereby it is possible to apply and release the shoe at fixed intervals. For the purpose of this report, it will be sufficient to say that there are two sets of connecting gears. By the use of one, known as Gear A, the shoe is in contact with the wheel approximately one-tenth of the time and, by use of the other, known as Gear B, the shoe is in contact one-fourth of the total time. As stated in the Proceedings for last year, the exact action is as follows:

THE CYCLE AS CONTROLLED BY GEAR A.

Revolutions during which shoe is in contact with the wheel..	150
Revolutions during which shoe is out of contact with the wheel	1,450

THE CYCLE AS CONTROLLED BY GEAR B.

Revolutions during which shoe is in contact with the wheel..	190
Revolutions during which shoe is out of contact with the wheel	610

THE SHOES TESTED were nine in number and were chosen from the fifteen shoes on which frictional tests were made and reported upon in the Proceedings for 1906, and which were also subjected to the wearing test in 1907. The laboratory numbers are as follows. 158, 161, 163, 172, 179, 183, 194, 200 and 205. A full description of these shoes will be found in the 1906 Proceedings.

SCHEDULE OF TESTS.—Each shoe was tested under a normal pressure of 1,080 and 4,152 pounds on a cast-iron wheel and under pressures of 1,080, 2,808 and 4,152 pounds on a steel-tired wheel. (The pressure of 2,808 pounds was not used upon the cast-iron wheel, as this pressure was employed in the tests of last year, the results of which are included in this report.) The cycle as controlled by Gear B was used when the brake shoe was under the lighter pressures, namely, 1,080 and 2,808. When the heaviest pressure was employed, Gear A was used, as under the action of Gear B the shoe was not given sufficient time to cool between the applications. A speed equivalent to twenty miles per hour was at all times maintained.

As was stated in the report of last year, no measurement of wear is complete which does not take into account the frictional qualities of the shoe. For this reason, three cards were taken under each pressure on both wheels. From these three cards, the coefficient of friction was obtained.

THE RESULTS are given in Tables II to VII. The arrangement of the tables is as follows:

Column 1 gives the laboratory number of the shoe. Column 2 gives the name of the railroad submitting the shoe. Column 3 gives the markings cast on the back or side of the shoe. Column 4 gives the coefficient of friction as determined from the average of three cards taken at intervals throughout the test. Column 5 shows the weight of the shoe before beginning the test. Column 6 gives the number of applications. Column 7 gives the total loss in weight. Column 8 gives the loss in weight per application. This equals the total loss in weight divided by the number of applications. Column 9 gives the number of million foot-pounds absorbed per application. This is found by multiplying the brake shoe pressure by the coefficient of friction (Column 4) by the distance in feet passed over by the surface of the wheel during the application and dividing by one million. Column 10 shows the million foot-pounds of work which can be done by each shoe for each pound of metal lost. It is obtained by dividing the values of Column 9 by those of Column 8. Column 11 shows the pounds of metal lost per one hundred million foot-pounds of work absorbed. This is the reciprocal of Column 10 multiplied by 100.

TABLE II.

CAST IRON WHEEL. BRAKE SHOE PRESSURE 1080#

NUMBER OF SHOE	RAILWAY CO. SUBMITTING SHOE.	MARKINGS ON SHOE	COEFFICIENT OF FRICTION.	WEIGHT OF SHOE. POUNDS.	NUMBER OF APPICATIONS	TOTAL LOSS OF WEIGHT. POUNDS.	LOSS OF WEIGHT PER APPLICATION POUNDS.	1,000,000 FOOT-POUNDS OF WORK ABSORBED PER APPLICATION.	1,000,000 FOOT-POUNDS OF WORK ABSORBED PER POUND OF MATERIAL LOST.	LOSS IN POUNDS PER 100,000,000 FT. POUNDS OF WORK ABSORBED.
1	2	3	4.	5	6	7	8	9	10	11
158	HOCKING VALLEY R.R.	S IF STREETER	41.7	21 826	90	.106	.001177	.739	628	.159
161	"	◇S	40.0	20.583	90	.225	.002500	.708	283	.353
163	AT & SF R.R.	BXU 36 PAT. 27 [illegible]	46.8	19.630	90	.099	.001100	.829	754	.132
172	"	C-79-B	36.4	16.815	90	.146	.001511	.645	427	.234
179	W & LE R.R	PITTSBURG BR. SHOE CO.	59.1	8.645	90	.101	.001122	1.047	933	.107
183	D M & N R.R.		51.9	7.280	90	.213	.002366	.919	388	.258
194	LSMS R.R.	C. & N.W. 8386	45.6	22.592	90	.101	.001122	.807	720	.139
200	"	STREETER	43.4	15.545	90	.141	.001566	.769	491	.204
205	"	R.C.P.C. 3360 PAT. 4-11-[illegible]	41.2	16.531	90	.346	.003844	.730	190	.526

L.B.C.

TABLE III.*

CAST IRON WHEEL. BRAKE SHOE PRESSURE 2808*

NUMBER OF SHOE.	RAILWAY CO. SUBMITTING SHOE.	MARKINGS ON SHOE	COEFFICIENT OF FRICTION	WEIGHT OF SHOE. POUNDS.	NUMBER OF APPLICATIONS.	TOTAL LOSS OF WEIGHT. POUNDS.	LOSS OF WEIGHT PER APPLICATION. POUNDS.	1,000,000 FOOT-POUNDS OF WORK ABSORBED PER APPLICATION.	1,000,000 FOOT-POUNDS OF WORK ABSORBED PER POUND OF MATERIAL LOST.	LOSS IN POUNDS PER 100,000,000 FT. POUNDS OF WORK ABSORBED.
1	2	3	4	5	6	7	8	9	10	11
158	HOCKING VALLEY R.R.	S JF STREETER	22.5	22.046	90	.229	.002544	1.036	.407.	.246
161	"	⟨S⟩	21.8	21.208	94	.644	.006850	1.004	146.	.684
163	AT & SF R.R.	BTU 36 PAT. 2F 2D 1900.	21.7	19.964	118	.337	.006856	1.000	350	.285
172	"	C-79-B	22.8	17.180	90	.366	.004066	1.050	258	387
179	W & L E R.R.	PITTSBURG BR. SHOE CO.	36.8	9.298	40	.593	.014825	1.695	114	.876
183	D M & N R.R.		38.7	7.846	60	.615	.010250	1.782	173	.578
194	LS MS R.R.	C.&N.W.RY 8386	26.5	22.730	90	.198	.002200	1.220	554	.180
200	"	STREETER	22.7	15.780	90	.243	.002700	1.045	387	.258
205	"	P.C. PC 3960 PAT. 4-11-93	23.5	17.610	90	1.058	.011755	1.082	92	1.087

* RESULTS IN TABLE II TAKEN FROM REPORT OF LAST YEAR.

TABLE IV.

CAST IRON WHEEL. BRAKE SHOE PRESSURE 4152*

NUMBER OF SHOE.	RAILWAY CO. SUBMITTING SHOE.	MARKINGS ON SHOE.	COEFFICIENT OF FRICTION.	WEIGHT OF SHOE. POUNDS.	NUMBER OF APPLICATIONS.	TOTAL LOSS OF WEIGHT. POUNDS.	LOSS OF WEIGHT PER APPLICATION. POUNDS.	1,000,000 FOOT-POUNDS OF WORK ABSORBED PER APPLICATION.	1,000,000 FOOT-POUNDS OF WORK ABSORBED PER POUND OF MATERIAL LOST.	LOSS IN POUNDS PER 100,000,000 FT. POUNDS OF WORK ABSORBED.
1	2	3	4	5	6	7	8	9	10	11
158	HOCKING VALLEY R.R.	S IF STREETER	23.3	20.800	60	.152	.002533	1.246	492	.205
161	"	◇S	23.9	18.784	45	.264	.005866	1.279	218	.458
163	AT & SF R.R.	B XU 36 PAT. 27 20 1900	26.4	18.720	60	.141	.002350	1.412	601	.166
172	"	C-79-B	24.1	14.645	45	.328	.007288	1.289	177	.564
179	W & LE R.R.	PITTSBURG BR. SHOE CO.	30.0	6.139	15	.368	.024530	1.605	65	1.540
183	OM & N. R.R.		36.7	5.53	15	.286	.019060	1.963	103	.971
194	LS MS R.R.	C & N.-W. B386	29.3	21.525	60	.112	.001860	1.567	840	.118
200	"	STREETER	29.8	14.590	60	.152	.002533	1.584	629	.159
205	"	P.C. P.G. 3960 PAT. 4-11-93	25.2	14.520	15	.226	.015070	1.348	89	1.124

L.E.L.

TABLE V.

STEEL TIRED WHEEL. BRAKE SHOE PRESSURE 1080#

NUMBER OF SHOE.	RAILWAY CO. SUBMITTING SHOE	MARKINGS ON SHOE.	COEFFICIENT OF FRICTION.	WEIGHT OF SHOE POUNDS.	NUMBER OF APPLICATIONS.	TOTAL LOSS OF WEIGHT. POUNDS.	LOSS OF WEIGHT PER APPLICATION. POUNDS.	1,000,000 FOOT-POUNDS OF WORK ABSORBED PER APPLICATION.	1,000,000 FOOT-POUNDS OF WORK ABSORBED PER POUND MATERIAL LOST.	LOSS IN POUNDS PER 100,000,000 FT. POUNDS OF WORK ABSORBED
1	2	3	4	5	6	7	8	9	10	11
158	Hocking Valley RR.	S IF STREETER	32.4	21.685	90	.172	.001911	.574	300	.333
161	"	<S>	35.3	20.270	90	.229	.002544	.625	246	.406
163	A.T. & S.F. R.R.	BXU 36 Pat. 272 D 1900	33.8	19.505	90	.128	.001422	.599	421	.238
172	"	G 79-B.	38.6	16.598	90	.262	.002911	.684	235	.425
179	W. & L.E. R.R.	PITTSBURG BR. SHOE CO.	36.4	8.406	90	.740	.008222	.645	78	1.283
183	D.M. & N R.R.		53.3	7.048	90	.230	.002622	.948	361	.277
194	L.S.M.S. R.R.	C. & N.W. 8386	36.4	22.421	90	.159	.001760	.645	365	.274
200	"	STREETER	34.1	15.360	90	.167	.001855	.604	325	.308
205	"	P.C.P.G. 3960 Pat. 4-11-9	36.3	16.110	90	.516	.005733	.643	112	.892

TABLE VI.

STEEL TIRED WHEEL. BRAKE SHOE PRESSURE 2808*

NUMBER OF SHOE.	RAILWAY CO. SUBMITTING SHOE.	MARKINGS ON SHOE.	COEFFICIENT OF FRICTION.	WEIGHT OF SHOE POUNDS.	NUMBER OF APPLICATIONS.	TOTAL LOSS OF WEIGHT. POUNDS.	LOSS OF WEIGHT PER APPLICATION, POUNDS	1,000,000, FOOT-POUNDS OF WORK ABSORBED PER APPLICATION.	1,000,000, FOOT-POUNDS OF WORK ABSORBED PER POUND OF MATERIAL LOST.	LOSS IN POUNDS PER 100,000,000 FT. POUNDS OF WORK ABSORBED.
1	2	3	4	5	6	7	8	9	10	11
158	HOCKING VALLEY R.R.	S IF STREETER	23.8	21.510	90	.430	.004777	1.046	229	.437
161	"	◈	26.9	20.040	90	.666	.007400	1.239	167	.599
163	A.T.&S.F. R.R.	BxU36 [illegible]	23.1	19.373	90	.403	.004477	1.064	238	.420
172	"	G 79-B.	26.2	16.336	90	.926	.010277	1.206	117	.855
179	W.&L.E. R.R.	PITTSBURG BR. SHOE CO.	34.3	7.672	45	.866	.018133	1.579	87	1.150
183	D.M.&N. R.R.		37.9	6.812	45	.782	.017377	1.745	100	1.000
194	L.S.M.S. R.R.	C.&N.W. 8386	21.9	22.272	90	.432	.004800	1.008	210	.476
200	"	STREETER	26.6	15.192	90	.341	.003788	1.225	323	.310
205	"	P.C.P.G 3960 Pt. 8-11-83	23.6	15.594	90	.681	.015133	1.087	72	1.390

J.G.C.

TABLE VII.

STEEL TIRED WHEEL. **BRAKE SHOE PRESSURE 4152#**

NUMBER OF SHOE.	RAILWAY CO. SUBMITTING SHOE.	MARKINGS ON SHOE.	COEFFICIENT OF FRICTION.	WEIGHT OF SHOE. POUNDS.	NUMBER OF APPLICATIONS	TOTAL LOSS OF WEIGHT. POUNDS.	LOSS OF WEIGHT PER APPLICATION. POUNDS.	1,000,000 FOOT-POUNDS OF WORK ABSORBED PER APPLICATION.	1,000,000 FOOT-POUNDS OF WORK ABSORBED PER POUND OF MATERIAL LOST.	LOSS IN POUNDS PER 100,000,000 FT. POUNDS OF WORK ABSORBED.
1	2	3	4	5	6	7	8	9	10	11
158	HOCKING VALLEY RR	5 IF STREETER	20.0	21.088	45	.247	.005488	1.072	195.	.513
161	"	◈	24.9	18.379	45	.410	.009111	1.335	146.	.685
163	AT&SF R.R.	BXU 3C PAT. 87 20000	24.1	18.972	45	.223	.004955	1.131	228.	.439
172	"	C-79-B	30.5	15.410	45	.688	.015288	1.635	107	.935
178	W&LE R.R.	PITTSBURG BR. SHOE CO.	29.5	6.805	15	.551	.036733	1.582	43.	2.320
183	DM&N R.R.		38.4	6.030	15	.439	.029266	2.060	70.	1.430
194	LSMS R.R.	C.&N.-W. 8386	18.7	21.835	45	.262	.005822	1.002	172.	.582
200	"	STREETER	25.9	14.850	45	.187	.004155	1.388	334	.300
205	"	P.C. P.C. 3560 PAT. 4-11-03	25.2	14.917	15	.326	.021732	1.351	62	1.610

J.C.C.

The results obtained from the cast-iron wheel, as given in Column 11 of Tables II, III and IV are plotted in Fig. 3. Those from the steel-tired wheel, as given in Column 11 of Tables V, VI and VII are plotted in Fig. 4. The lower or black area represents the loss in weight while the shoe is absorbing one hundred million foot-pounds of work under a brake shoe pressure of 1,080. The middle or horizontally shaded area represents the loss in weight while the shoe is absorbing one hundred million foot-pounds of work under a brake shoe pressure of 4,152.

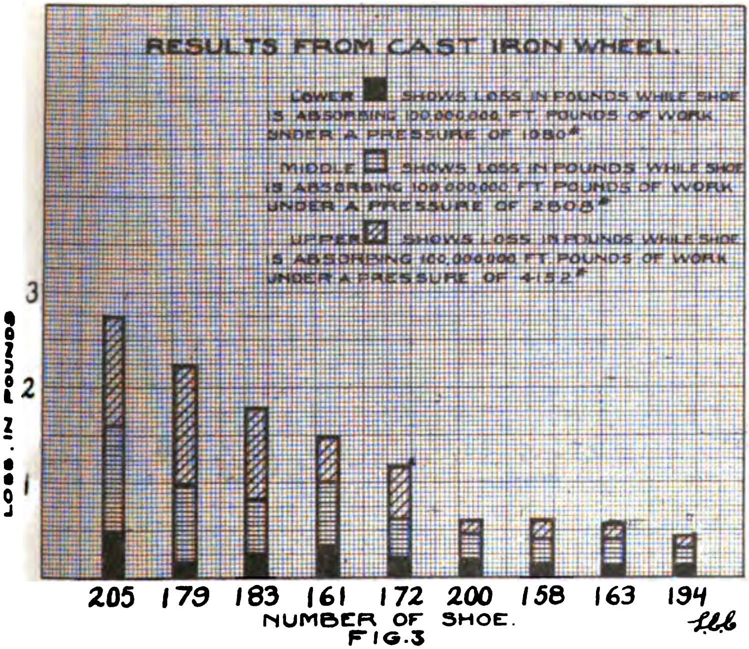


FIG. 3

The plotted values shown in Figs. 3 and 4 are arranged in the order of total loss in weight per three hundred million foot-pounds of work; one hundred million at each pressure.

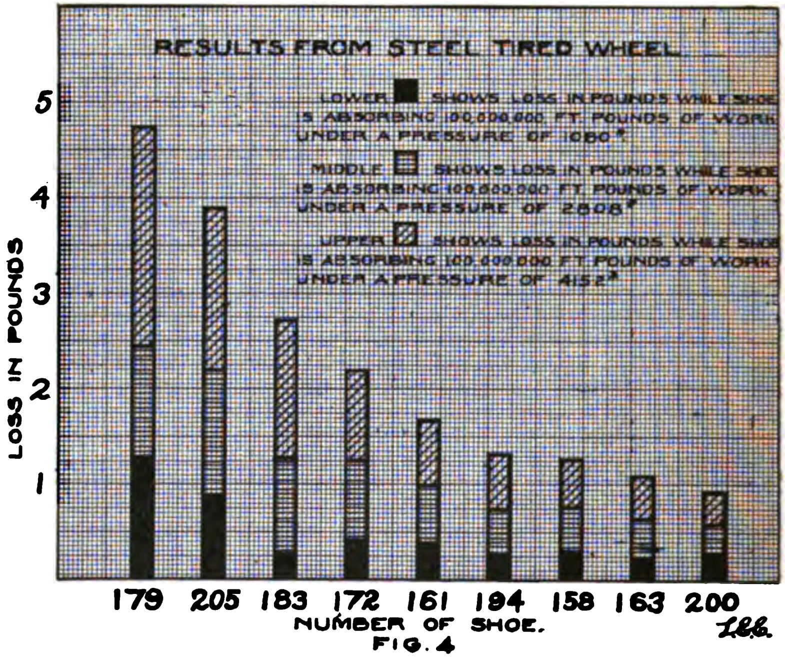


FIG. 4

It will be seen that the order does not remain the same on the cast-iron and steel-tired wheels; also, that the loss in weight for any given shoe on the steel-tired wheel is greater than that of the same shoe on the cast-iron wheel.

Respectfully submitted,

Louis E. Endsley,
Asst. Prof. Railway Mechanical Engineering.

APPENDIX III.

ANALYSES OF SHOES TESTED.

By the courtesy of Mr. George F. Griffin, Vice-President of the Griffin Wheel Company, an analysis has been made of drillings taken from the body and the insert (in case inserts were present) of each shoe tested. The results are given as Table VIII., which follows:

TABLE VIII.
CHEMICAL ANALYSIS OF BRAKE SHOES.

	Silicon per cent.	Manganese per cent.	Total carbon per cent.	Combined carbon per cent.	Phosphorus per cent.	Sulphur per cent.
158 Shoe.......	1.82	.61	3.01	.58	.70	.199
161 Shoe.......	1.42	.57	2.92	.63	.65	.173
163 Shoe.......	*	.43	2.53	1.12	.47	.144
172 Shoe.......	1.94	.27	3.00	1.29	.70	.123
172 Insert......	.15	.55	.94		.21	.077
179 Shoe.......	*	.51	2.92	Trace	.13	.043
179 Insert.. ...		.39	16.83	.40	.29	.060
183 Shoe.......	.15	.47	.70		.05	.044
183 Insert.	*	.25	12.80	.61	.29	.063
194 Shoe..	1.13	.27	3.31	1.40	.66	.164
194 Insert......	.06	.03	Trace		.28	.069
200 Shoe.......	1.22	.23	3.69	.75	.70	.060
200 Insert......	.58	.41	3.47	2.78	.26	.126
205 Shoe.......	1.24	.37	3.17	1.31	.57	.195

*Sample contains sand and dirt.

Dean Goss: I wish to refer to a criticism of the report. This was submitted to the committee by Mr. Sargent, who has always taken great interest in this work. He suggests that instead of giving the marking upon the shoes in connection with the description thereof, we give the trade names. Mr. Sargent writes as follows:

> Referring to the Table 1 of shoes tested, I would call your attention to the column entitled, "Marking on Shoe." This marking does not signify anything, and it will be better to simply designate the trade name of the shoe and its description as I have outlined it in the table attached, for the reason that there are some mistakes in the marking of the shoe. For instance, No. 161 is a Streeter shoe and not Diamond "S" as the trade-mark would indicate. This is a mistake on the part of one of the moulders in applying the wrong trade-mark. Shoe No. 163 was dated 2-20-1900, the date of the "U" patent. Shoe No. 205 should be marked "P. P. Co.," the mark of the Pullman Company. The markings do not signify anything, whereas the trade names, as indicating the particular type of shoe, is familiar to all railroad men.

I wish to say in response to this criticism, which is a fair one, that throughout its work, the Committee on Brake Shoes has had a great deal of trouble in designating the shoes which it had worked upon. We have in some of our earlier reports attempted to give trade names and then have been told that we made mistakes. Finally, the committee believed that the wise thing to do was to give what was on the shoe as has been done in the report. That no one need go astray the committee has caused the shoes subjected to test this year to be placed on exhibition at the entrance door of the hall so that if the description is not satisfactory, the shoes are here to speak for themselves.

The President: What is your pleasure with the report?

Mr. Sanderson: I move that it be the sense of this convention that the recommendation of the committee as given in paragraph 7 for future work be urged on the committee of next year for its work.

Mr. Muhlfeld: I agree in what Mr. Sanderson has just said, and I may state that the report of this committee brings out some very important information, and it should be of great advantage to railroad companies in deciding questions pertaining to brake shoes as well as to wheels. It appears from the report of the committee that the kind of wheel on which the brake shoe is used largely affects the coefficient of friction as well as the quality of the brake shoe from which the best results can be obtained. In view of the continued increase in the average running speeds of freight trains and in the brake-shoe pressures on account of the percentage of automatic braking power, due to the use of high speed and high-pressure control, the higher rated pressure-retaining valves and the greater calculated braking pressures, it is important that the allowable brake shoe for application to equipment in interchange shall be able to withstand high and continuous heating due to braking pressures and speed as well as impact, and give the minimum wear and heating to brake shoes and wheels consistent with the proper coefficient of friction. The item of safety due to breakage of either the brake shoe or the wheel is also of considerable importance. From examination of a considerable number of various kinds of system and foreign brake shoes and brake beams that had found their way to the scrap, it was noted that about twenty-five per cent of all brake shoes examined were removed, due to breakage, and that about forty-five per cent of all brake beams that had been removed were due to the worn condition of one or both brake heads, the evidence being that the majority of the wear was due to broken brake shoes. Of the removed brake shoes examined it was found that the average weight of the remaining piece of the broken shoes was 8½ pounds, whereas that for the unbroken shoes was 10½ pounds. Failures such as referred to, due to wear and breakage, involve liability for accident as well as greater cost for maintenance; and in view of the continued increase in the working weight of passenger and freight cars and the use of the higher brake-shoe pressures, the efficiency and cost for maintenance of the entire brake mechanism, in which is involved the mileage and salvage return per brake shoe, is an item of considerable consequence, more particularly when it has been found that the difference in mileage of certain suitable brake shoes may vary as 3 to 1 when used under similar wheel, braking pressure and service conditions and which may be further affected as 2 to 1 by application to steel-tired as compared with chilled cast-iron wheels.

From the committee's report, while the wearing and frictional qualities of brake shoes have been covered, when used in connection with chilled cast-iron and steel-tired wheels, the item of wear, grooving or heating of the treads of wheels has not been commented on. As the conclusions justify the use of an insert type of brake shoe, the quality of the material in the insert and in the body of the shoe is one of considerable importance. Furthermore the desirability of reinforcing the body of the shoe or the keying lug, or both, for certain speeds, brake-shoe pressures and service conditions, is one that should be investigated and the allowable limit of wear defined. We would therefore move the suggestion that the committee's report be accepted and that the committee be given the necessary additional facilities that it desires in order to carry on its work and that it be requested to submit a proposed specification covering the items of material reinforcement, test and limits of allowable wear, which will cover the most suitable car-brake shoe for steel-tired and cast-iron wheels for passenger and freight service under the different braking pressures.

THE SECRETARY: The motion is that the recommendation of the committee in Item No. 7 together with the recommendations made by Mr. Mühlfeld be referred to the Executive Committee for consideration.

(Motion seconded and carried.)

THE PRESIDENT: The next on the list is the report of the Standing Committee on the Tests of M. C. B. Couplers. The report will be presented by Mr. T. H. Curtis.

Mr. Curtis here read the report on Tests of M. C. B. Couplers, which is as follows:

REPORT OF STANDING COMMITTEE ON TESTS OF M. C. B. COUPLERS.

To the Members:

In addition to the usual work pertaining to tests of M. C. B. couplers, the Executive Committee referred certain subjects to your Committee which are presented under their respective headings.

UNCOUPLING ATTACHMENT.

The Executive Committee referred the following subject to your Standing Committee on Tests of M. C. B. Couplers: "The investigation of the cause of broken links and clevises, bent uncoupling rods, and to submit a design of uncoupling rod to obviate these troubles." To further this investigation a circular was sent out containing the following questions, to which are attached the substance of the replies from fifty-one roads representing 1,120,000 cars.

(1) Causes of broken links and clevises?

From excessive slack in draft rigging	41
" improper or light material	23
" short chain	18
" long chains caught behind coupler horn	13
" improper repairs	10
" shifting loads	7
" kinked chain	2
" couplers not provided with lock-set	1
" couplers of unequal height	1
" lock pin inoperative	1

(2) Causes of bent uncoupling rods?

From excessive slack in draft rigging	32
" shifting loads	21
" short chain	12
" rough handling	9
" cars cornered	8
" push pole slipping	7
" improper material or repairs	5
" other causes	11

(3) Are these failures more prominent on wooden cars or steel cars?

Wooden cars	42
Same on wooden and metal cars	7
Steel cars	5
No answer	4

(4) Are these failures more prominent on cars equipped with spring or friction draft gear, and if so, on what specific type?

On spring gears	30
No difference noted	14
Single spring	11
American continuous	9
Friction gears	5
No friction gears used	2
Stem attachment	1

(5) Style and description of uncoupling arrangement with which most trouble is experienced and wherein the specific trouble lies?

M. C. B. type	17
Some trouble with all	14
Special devices	8
Weal links and brackets	5
All arrangements with bracket on deadwood	4
Chain dropping in lock hole	3
With couplers lock-setting on bracket	2
On cars subject to shifting loads	1
Center bracket not slotted	1
Attached by lag screws	1
Open link chain and clevis	1

(6) To what extent is freight equipment used in passenger service and what provision is made to prevent the buffer on the passenger car interfering with the uncoupling arrangement on the freight car?

No provision made, no difficulty	15
Not used in passenger service	11
Buffers removed	10
Special devices	5
No answer	4
Freight coupler used on passenger car	2
Protected by buffers on freight cars	1

(7) What form of release arrangement is preferred by the trainmen?

Double ended	11
Special devices	11
M. C. B. type	8
No decided preference	8
Straight outward pull	3
Side or under	1

(8) What form of universal release rigging is recommended to suit all types of M. C. B. standard couplers?

Special devices	22
No answer	13
M. C. B. type	12
None to recommend	7
Double ended	5
Outward pull chain	1
Side release	1

An examination was made of several thousand uncoupling attachments and a careful and detailed investigation of 1,764 of this number as regards design, application, condition, maintenance, repairs and operation. This was conducted on five railroad systems, and as both foreign and home cars were inspected it covers practically all classes of cars offered in interchange, as well as all kinds of attachments. The results are tabulated on Sheet 3, and are shown graphically on Sheets 4 and 5, patented devices not being included in these statements. Four main styles of uncoupling attachments for M. C. B. couplers are found, namely, single-end rods on concealed end sill cars, single-end rods fastened to front of end sill on projecting end sill cars, single-end rods fastened on top of end sill close to body on projecting end sill cars and double-ended rods. Attention is directed to certain particulars brought out in the investigation shown on Sheet 3. The general design, application and maintenance of some uncoupling attachments is not altogether satisfactory, for example, 22 per cent of the rods will not operate the coupler knuckle throw, and 11 per cent will not raise the lock to the lock-set position, 18 per cent have uncoupling rods with center arm only three to six inches long, and 17 per cent have a chain slack as much as from three to seven inches; split links and "S" hooks combined average 12 per cent; more than one-half of the brackets are applied with lag screws instead of bolts and 71 per cent of the links and 74 per cent of the clevises are of smaller size than the recommended practice, which calls for 5/8-inch links and clevises. The style of rod fastened to front of end sill is the least efficient, while, in general, the single-end rod on concealed end sill cars and the single-end rod on back of end sills give better service. Besides the data contained on attached sheets, a large number of uncoupling attachments were found having loose lag screws, rods binding on brake staffs, retainer pipes, ends of car, etc., and with the handle improperly located.

As will be seen by answers to questions 1 and 2, excessive slack in draft rigging is largely responsible for broken links and clevises and for bent rods, but this condition is seldom found on steel and steel underframe cars equipped with high capacity spring or friction draft gears. It is found largely in the older and lighter equipment having wooden draft arms with single springs and three-bolt draft stops bolted to side of draft timbers and not gained into same, which are not maintained in proper repairs for service under varying conditions. Often this equipment is perfectly suited to run on the home road in light trains, but, when away from home at the head of trains hauled by two or more heavy locomotives over heavy grades, is not equal to the service and results in loosening up of the draft gears and consequent breaking of chain or bending rods.

In this connection it should be noted that the release rigging on these older cars are designed for use with the couplers without lock-set in the coupler head, but lock-setting was accomplished by supporting the release rod on a shelf provided on the end bracket, which required a neat adjustment of chain. This design worked out very well for the couplers in use during that period when chains had sufficient slack, as the draft arrangements were adequate for the weight of trains handled. Now, however, these same cars are having the modern lock-setting and knuckle throwing types of couplers applied, requiring as much as six inches lift, using the same length arm on rod and same chain connection which was used when springs were subjected to 25,000 pounds pull. Whereas, now, two engines are frequently used exerting a tractive force of from 70,000 to 80,000 pounds, while the stresses in trains due to rough handling have been accurately measured and found sometimes to exceed 600,000 pounds. This condition is bad enough in the type of draft rigging noted above, but the worst conditions are present on cars equipped with the American continuous draft gear. There are now, however, relatively few of the latter in service and these are being replaced with improved types of draft gears.

Rods.—On some of the older types of couplers the lock does not operate in central vertical plane and the rod should be changed when an M. C. B. standard is applied, but this is not often done and the old rod causes certain difficulties in the operation of the coupler. On box cars with concealed end sills uncoupling rod is liable to be made inoperative when end of car is forced outward; on all forms of uncoupling rods and particularly double-ended rods requiring more than two bearings this trouble is rather pronounced and is aggravated by often using such brackets that place the rod close to the siding so that slight bulging of the end interferes with operation of rod. Proper care is not taken to offset or locate rods a sufficient distance from brake staff, retainer pipe, end posts, etc., to provide the necessary clearance for operation. Occasionally bends made to clear these obstructions allow insufficient movement of rod to properly throw the knuckle. Double-ended release is preferred by some; however, it is a fact that these double rods are frequently bent and are liable to become totally inoperative. Bent rods attributed to shifting loads are frequently damaged by coming in contact with rods on coupled cars when the slack in the train is bunched. Rods with long center arms located on face of end sill, with draft gear in release position, on which the eye of rod is more than two inches ahead of eye of coupler lock are liable to interfere when coupler horn is against striking plate, especially when draft attachments and end sills are in a worn condition. A rod with the handle on the side of car is undesirable on account of interference with the use of the sill step and its liability to become bent or broken in such an exposed position.

Brackets.—The design and attachment of brackets have an important influence on the operation of the uncoupling attachment. The usual brackets allowing but little play to the rod are a source of inoperative uncoupling attachments. Your Committee believes that the best form of center bracket is one having a slot which gives the rod about

3½ inches longitudinal travel and is attached to the car by bolts. The outside bracket on wooden cars is generally attached by lag screws and, as it is usually necessary to remove these lags to straighten bent rods, it is felt that bolts are preferable. There are two or three brackets on the market allowing the rod to be removed without removing the bracket itself, which is a good feature, especially for yard repairs. On steel equipment the brackets are usually attached by bolts and no trouble is experienced. Occasionally they are attached by rivets, which is undesirable, because it is either necessary to straighten the rod on the car or to cut off the rivets, unless the brackets are of that type mentioned above.

CHAINS.—Short chains is a condition not confined to the old wooden cars but is frequently seen on steel and steel underframe cars of modern construction. One reason for this is that the coupler manufacturers usually provide a chain of fixed length which is being used for all designs of rods and car end constructions, instead of arranging the length of chain with reference to the end construction, type of rod used, travel of gear, etc. This defect is noted more frequently on cars equipped with couplers having the floating type of lock, which are generally provided with a chain so that a clevis only is necessary to connect lock to rod. This difficulty has been avoided in some instances by using an extra clevis or a clevis provided with two holes. It is recommended that these chains must have an eyelet above locking-pin hole so that the recommended links and clevises can be used. This should avoid the use of split links and " S " hooks.

"Kinked chain" is a defect usually found on the floating lock type of couplers, the links wedging in coupler head so that repeated jerking on the rod fails to dislodge them, making adjustment necessary. Insufficient attention is given to this matter, and it is felt that, were the links for this purpose secured and well-fitted to locks, less trouble would be experienced. Couplers having a long single-piece lock require close adjustment of uncoupling attachment to prevent binding and consequent heavy duty on the release rod and chain. The use of a large number of links of small chain should be discouraged, as they break easily, and when one link breaks it is usually replaced by an " S " hook or split link. It follows that the best practice is the use of two heavy malleable iron clevises cored for ¾-inch pins connected by a single heavy wrought iron or malleable link.

Improper or light material both in original construction and in repairs is a large factor in the increased number of bent uncoupling rods and of broken links and clevises; the use of split links and " S " hooks instead of clevises and bolts instead of pins, contributes to a large number of failures. There is little excuse for these practices on the shop tracks and in the yards; such points should be provided with a supply of standard links, clevises and pins to insure cars being repaired with standard material. Attention is directed to the fact that certain coupler companies are furnishing clevises which use the ½-inch instead of the recommended ¾-inch pin. The use of bolts should be discouraged, as the nut works off, making uncoupling attachment inoperative. Large cotter pins are also used instead of the recommended ¾-inch pins.

There are other causes for bent rods and broken links and clevises, many of which are not chargeable to design or maintenance of uncoupling attachment but solely due to carelessness of those handling cars. Cars cornering in yards is the cause for a great many bent rods, as is also the careless use of push poles.

Interference with Passenger Car Buffers.—From the answers received there is apparently little trouble from the buffers of passenger equipment making uncoupling attachment of freight equipment inoperative when these two classe of cars are coupled together. It is not the practice on many roads to run freight equipment cars in main line passenger service, but where this is done, either the buffers are removed, or some special release device is used. The use of the two classes of equipment together is largely confined to branches where the passenger equipment is of the older type, and, having the two circular buffers, little difficulty is found in the way of interference.

Proposed Uncoupling Attachment.—It is the belief of your Committee, based on the replies to the circular of inquiry and on the investigation made, that considerable trouble from inoperative attachments is due, first, to not taking into consideration, when designing, all the various elements necessary for efficiency in operation and repairs; and second, a lack of proper attention to maintenance after application. It is believed that for all classes of cars and for all couplers which come under the M. C. B. Standards a single ended rod properly designed is the most suitable arrangement not covered by patents that can be used. Acting on this, changes are suggested in M. C. B. Sheet B, which it is thought will overcome the defects in design and reduce to a minimum the troubles incident to improper maintenance; this is shown on attached Sheets 1 and 2.

The special feature of this uncoupling attachment is the slotted center bracket, which has been in use on a number of roads for some time, and very few cases of bent rods, etc., are found on cars so equipped. By placing the rod back on top of end sill or head block a longer arm is obtained, which gives sufficient lift with ample slack in the chain, and by using a sloping slotted bracket the rod projects 1½ inches in front of coupler lock, which is about the best position for an efficient lift. The slotted bracket allows the rod to slide back 3½ inches and avoids interference when slack of train is bunched.

The handle shown should preferably project below end of car or be bent as shown by dotted lines on Sheet 1, in order to protect the operator's hand.

The present Recommended Practice Sheet B, shows a chain 8½ inches long with one 5¾-inch link; the proposed recommended practice shows two additional links 3¾ inches and 7¾ inches long, respectively. By using one of these three links, therefore, a chain 6½, 8½ or 10½ inches long is obtained, which should fit all cars and M. C. B. couplers. These links should avoid the use of split links, "S" hooks and other temporary repair devices now very common. The arrangement as a whole is applicable to all types of cars, and if properly applied will largely obviate present troubles. Only a few limiting dimensions are shown on the drawing, as the others must be adapted to each particular class of car; but the dimensions for center arm, chain slack and position of lift pin eye should be carefully adhered to.

SIDE AND BOTTOM OPERATING COUPLERS.—There are a number of types of side and bottom operating couplers in service to a limited extent on several roads, some of which present good features. Your Committee has also examined some types of these couplers in process of development at the works of the manufacturers, and the best that can be said is that they are still in an experimental stage. The main objection that can be seen at the present time is that each coupler requires a special form of uncoupling attachment. On the side operating couplers the rods, bell cranks and pivot points, provided on the coupler head, are liable to be damaged by couplers passing on curves of short radius. On the bottom operated couplers similar conditions prevail with the addition that, in some forms, the uncoupling attachment is secured by drop hangers, which are likely to become damaged by coming in contact with certain designs of bumping posts. Furthermore, a great number of parts are usually required for these uncoupling attachments.

It has been suggested that the specifications should be modified to permit the use of the side and bottom operated couplers. Not long since there was a decided sentiment in favor of adopting one standard coupler, which was found impracticable at that time, and your Committee was instructed to continue making the specifications more rigid, with the object of ultimately reducing the number of types of couplers to a minimum, and therefore retaining only those embodying designs which will give both maximum strength and the best operating properties. As a result of this the M. C. B. coupler has been developed to that point where a common standard uncoupling attachment can be used with all types meeting the specifications, and consequently the number of repair parts for both coupler and uncoupling attachment are relatively small. In addition to this the proposed couplers have only been tested in service to a very limited extent.

In view of the foregoing, it is believed inadvisable to open the specifications to admit the use of side or bottom operated couplers until such time as the merits of either one of these can be recommended in place of the present standard, but in order to ascertain the availability of these proposed devices, your Committee would suggest that they be given an extended trial by different railroads on cars of their own equipment, preferably on those not offered in interchange.

In view of past experience your Committee believes that changes in the Recommended Practice and Standards of the Association should only be suggested after careful deliberation, especially in cases of experimental arrangements, which should be thoroughly tried out before being included in specifications, so as to avoid too rapid changes, which may result in error, and with this in mind the above view of the question is taken.

OPERATION AND CONDITION OF COUPLERS.

With a view of obtaining definite information relative to the operation and condition of couplers in service, your Committee made an investigation of about fifty each of the ten most prominent types, and results are tabulated on Sheet 6, attached. The numbers at the top, representing the names of the couplers, are the same used last year, with three additional types, and are arranged in chronological order with the older couplers on the left. No data was taken in cases where the coupler had been fitted with improper parts, such as wrong knuckle pins, or where the uncoupling attachment did not operate properly.

Under the first heading, "Average distance from point of knuckle to guard arm," three types average 4 15-16 inches, only 3-16 inch from the 5⅛-inch M. C. B. Worn Coupler Limit. This is mostly due, on No. 4 coupler, to excessive wear on the knuckle tail and lock bearing; on No. 8, to worn pivot pin holes, and on No. 25, to improper fitting of the new couplers. Many of the latter are found measuring 4⅞ inches to 5 inches when new, indicating clearly that they were not inspected in accordance with the specifications of the Association.

The knuckle-throwing feature of most couplers is very unsatisfactory; it was found inoperative in 27 per cent of all knuckle-throwing couplers, and 61 per cent on one make. The inclined plane type of knuckle-throw used on several types of couplers works fairly well on new couplers, but after service the engaging surfaces on the lock and knuckle tail become flattened, resulting in an inoperative knuckle-throw. Possibly an improvement could be made by having the lock engage bottom of inclined plane farther away from the edge nearer the pivot pin side. A steeper incline would also probably help the matter, but this may make the lift of the locking pin excessive. Some couplers now require from 6 inches to 6½ inches lock lift to throw the knuckle, which is too much for many types of uncoupling attachments with which the cars are now equipped. To prevent couplers from having an excessive lock lift, which would further complicate the uncoupling question, your Committee recommends that the lock lift shall not be more than 6 inches. Failure to knuckle throw is also due on some types of couplers to the chain becoming kinked or bent inside the coupler head. The coupler having highest per cent of knuckle-throw inoperative has a spring to throw knuckle, and from observation it would appear that springs have no place in a freight car coupler. Your Committee feels that the manufacturers should improve the knuckle throw, as it is a recommended practice of the Association and should be advanced to standard as soon as couplers can be made that are satisfactory in this respect.

Under "Lock-set inoperative," it can be seen from the table that most modern couplers are fairly satisfactory, the one coupler having high percentage inoperative is no longer made. It is a very important feature, however, and care should be taken in designing couplers to insure a positive lock set and allow for conditions of wear and service.

"Knuckle tail bearing worn" and "Lock bearing worn." The knuckle tail and lock bearing should be so located that the bearing will be central in relation to the horizontal center line of coupler and of sufficient area to avoid excessive wear, and both the lock and knuckle tail should be substantially backed up by the wall of the bar to stand the heavy service to which couplers are now subjected, and to reduce the large number of lock and knuckle renewals. Improper wear of these parts is also caused by pivot pins smaller than standard to coupler being applied on repair tracks and on the road. This results in undue wear and distortion of contour lines and allows the knuckle to open slightly, resulting in the knuckle tail not bearing squarely on the lock.

"Pivot pin bent and pivot pin worn." Some pins now furnished easily become worn, shouldered and bent, and a large number are renewed for these defects. These pins would undoubtedly fail were they tested in accordance with the Association's recommended practice for test of knuckle pins, and your Committee urges the members to specify this test in purchasing all pivot pins.

"Pivot pin hole worn." This, of course, is found on all couplers after they have been in service some time, but in some makes it is more rapid than in others, and proper design and fitting as well as thorough broaching of knuckles and lugs will prevent this wear becoming excessive. The knuckle should be designed and fitted so as to prevent strain on the pivot pin in buffing. The pivot pin hole throughout should be smooth, the surface should be as hard as possible, and the pin should have a driving fit in the lugs. Attention is also directed to the poor broaching of some types of knuckles and bars, in that this broaching removes only the cores and some of the sand and leaves the holes in a rough, out-of-round, and worn-out condition, so that the pin is easily bent and worn; this also interferes with the knuckle-throwing properties. This broaching to be effective should be done by power hammer or similar method to insure removing all projections and form a true and smooth hole.

Bent or broken locks are more frequent on couplers having the long one-piece lock. These become bent, both above and below the coupler head, by striking truss rod nuts on some classes of cars, carrier irons and other obstructions, which render the knuckles inoperative.

In addition to the above it has developed that when some of the coupler manufacturers changed the contour lines of the couplers in accordance with the Standards of the Association, they neglected to fill in the lines of the knuckle contour sufficiently to coincide with the new lines resulting from the addition of metal across the knuckle lugs of the bar, leaving an opening between the knuckle contour lines and the lines of the bar when knuckle is closed. This prevents the point of the mating knuckle engaging the knuckle tail continuously until the lock drops. Another item entering into the mating of couplers is the failure of some coupler knuckles giving a full opening. The point of knuckle should be in a line with the inside of the lugs on bar, which line should be parallel with the longitudinal center line of coupler.

COUPLER SPECIFICATIONS.

Recommended Changes.—As a large number of couplers are failing in service and a relatively small number are rejected under the present specifications and tests, it is felt that the specifications should be made slightly more rigid. Records show that out of 625,943 couplers accepted under the specifications from 1901 to 1906, inclusive, only 15,460, or 2.4 per cent, have been rejected. These rejections were as follows:

Guard arm test	8,160, or	53	per cent	of total	rejected.
Jerk test	6,000, or	39	"	"	"
Striking test	1,300, or	8	"	"	"
Pulling test	0, or	0	"	"	"

During the past year tests have been made under more rigid allowable limits for spread of guard arm, distortion of shank, and closure of knuckle, and with a steady pull of 150,000 pounds instead of 120,000 pounds. With the exception of the pulling test it was found that a relatively large number of couplers would be rejected were these changes incorporated in the specifications, and as it is doubtful whether this additional strength would be in the right direction, it is felt that these changes should be held in abeyance until more definite data can be procured, and the face breakage test hereafter referred to can be thoroughly developed. But in view of the increasing number of heavy locomotives, double-heading of trains, etc., your Committee recommends that the pulling test be changed as follows: "The couplers must stand a pull of 150,000 pounds," instead of 120,000 pounds; "A coupler shall be considered as having failed . . . if the knuckle has opened more than $\frac{5}{8}$ inch," instead of $\frac{3}{4}$ inch, "should either or both couplers fail to stand the prescribed test, but both stand 100,000 pounds," instead of 90,000 pounds, "another complete coupler or pair of couplers shall be provided . . . ."

The following table of trials made shows that the manufacturers will probably find little difficulty in designing couplers to stand this test.

PULLING TEST.

Knuckle opening at 150,000 pounds:

1/8″	3/16″	1/4″	5/16″	3/8″	7/16″	1/2″	9/16″	5/8″	11/16″
1	1	1	4	5	6	3	0	2	1

Number tested 24; number failed 1.

Knuckle opening at 100,000 pounds:

1/16″	1/8″	3/16″	1/4″
3	7	9	5

Number tested 24; number failed 0.

FACE BREAKAGE OF COUPLERS.—The 1907 coupler report showed conclusively that the weakest point in the coupler is through the face into the locking pin hole. To further substantiate this fact, the reasons for the removal of 6017, 5 by 7-inch shank couplers, representing nine different types were investigated and it was found that 4045, or 67.2 per cent, of these were removed on account of breakages through the face; this percentage varying from 54.6 per cent for one type of coupler to 81.7 per cent for another.

This failure is due to a wedging or spreading action between the lugs and guard arm, and as these parts are relatively stronger than the face the latter breaks. The thickness of metal in coupler face ranges from 5/8 inch to 1 7/8 inches, and no coupler is free from breakage in this place. In order to obtain additional strength, your Committee considered changing the 8 3/4-inch dimension from horn to inside face of knuckle to 9 1/4 inches. While the general sentiment is against making this change on existing couplers as it would prevent the interchangeability of locks and knuckles, it is felt that this dimension should be 9 1/4 inches on all new types of couplers put on the market after January 1, 1909, and that the face or front wall of couplers should have a minimum thickness of 1 1/4 inches and your Committee, therefore, makes the above recommendations.

The present specifications call for no test which shows up weakness at the face, and as this is the part of the coupler most frequently failing in service, it is believed that the specifications should contain a face test. With this in view experiments have been made with a number of devices, and the wedging block shown on Sheets 7 and 8 has so far been found satisfactory for the purpose. This device when given a sufficient number of blows with the drop, spreads lugs and guard arm and breaks the front wall of the coupler almost exactly as it is found in service. Sheet 7-A shows the position of the wedging block in the coupler head. It will be noted that the block has a bearing on the contour line at points common to all couplers and, therefore, the wedging action is the same for every type tested. This drawing also shows the wide variations in the relative locations of the lugs, and it is believed that limits should be established to confine the lugs within such dimensions that free mating of couplers will not be impaired, and your Committee will give this detail further consideration during the coming year. As can be seen from the drawings, Sheet 7, the coupler horn rests upon the base block and the coupler shank is wedged to hold it in position. A table and photographs showing results of some of these tests are found on Sheets 8-A, 8-B and 8-C. It is significant that the coupler having the thickest face required the largest number of blows to cause fracture. The face of this coupler averages about 1¾ inches thick, while on the others it ranges from ⅝ inch to 1⅛ inches. As a sufficient number of trials have not been made to fully develop this test, it is simply mentioned for the consideration of the members and not as a recommendation. Your Committee intends to make further trials with a view to later incorporating this test in the specifications, provided that after extended use no objections present themselves, and in this event it may be possible to eliminate the present guard-arm test. Meanwhile the manufacturers should do all in their power to strengthen this weak part in present couplers and should design all new types with a view to eliminating these failures.

STAMPING "M. C. B." ON COUPLERS AND KNUCKLES.—A portion of paragraph "8" of the present specifications for automatic couplers reads as follows:

> "After a lot of complete couplers have successfully passed the inspection and tests prescribed below, the letters "M. C. B." must be legibly stamped upon the plate on each coupler and knuckle, this mark to be evidence that the complete coupler is an M. C. B. standard."

The question has been raised as to what should be done in regard to this stamping in case a railroad has no test and inspection facilities. Your Committee, after carefully considering the matter, has reached the following conclusion, which has been sanctioned by the Executive Committee: Coupler manufacturers shall themselves be allowed to inspect and test their couplers in accordance with the M. C. B. specifications, for such railroads as may elect to have the coupler manufacturers do this work for them, with the proviso, that after the prescribed inspection and tests have been made, each coupler and knuckle must be stamped with the letters "M. C. B", with a prefix or addition indicating that the inspection and tests have been made by the manufacturer. This may either be the manufacturer's trade mark or some other designating mark, either of which must be filed with the Association. Your Committee does not consider it necessary to incorporate the above in the coupler specifications as it is simply an interpretation of an existing clause.

MALLEABLE IRON COUPLERS.—Your Committee wishes to again call attention to the continued use of malleable iron couplers. The M. C. B. specifications for automatic couplers which have been adopted as a standard of the Association require that "The couplers . . . must be made of steel . . . ," therefore, a malleable iron coupler is in no sense an

M. C. B. Standard, and its application should be discontinued on cars offered in interchange, as its strength is insufficient to withstand the service to which couplers are subjected on most roads.

FRICTION DRAFT GEAR.

The Executive Committee requested the Committee on M. C. B. Couplers to recommend a standard maximum capacity for friction draft gears, and the most desirable resistance during each ⅛-inch compression, also to report on the value of friction draft gear in reducing damage to cars and their contents. To secure data on the above subject, there was referred to the members a circular of inquiry embodying the following questions, to which are attached the substance of the replies from 53 railroads, representing 904,000 cars.

(1) Considering conditions which your road may have, such as locomotives with large tractive force, double heading of trains, mixed trains of steel and wooden cars, low capacity cars, etc., what is considered a desirable maximum capacity for friction draft gear?

150,000 to 200,000	17
200,000 to 300,000	6
300,000 to 400,000	4
100,000 to 150,000	2
No data	24

(2) How should this be distributed through each ⅛-inch travel of the gear to meet the special conditions outlined with least damage to equipment?

Travel should be increased to 3 inches or 3½ inches	3
Light at start	2
No data	31

(For other answers see curves on Sheet 15.)

(3) In general, has the value of friction or other improved gears had the effect of reducing damage to cars and contents in yards and on the road?

It is also due to heavier construction	11
Yes	29
No data	13

(4) To what extent has increased capacity of motive power, introduction of gravity yards, etc., influenced the use of improved draft gears on your road?

Made necessary by these influences	37
Rough handling in ordinary yards	2
No data	14

(5). Have you noticed any wide variations in the cost of maintenance in the draft gear itself, comparing the older spring gears with the recent large capacity spring and friction gears?

Modern gears cost less to maintain	34
Due partly to attachments	6
No data	13

(6) From your experience with friction gears on tenders and cars is it found that the gears require any considerable attention to keep them to their original capacity, and are many gears found jammed and failing to release in freight cars?

Capacity maintained after service	24
Do not jam	23
Found jammed and failing to release	10
Original capacity deteriorates	4
Broken casings and parts	4
Friction unsatisfactory	2
No data	16

Your Committee, in sending out the circular of inquiry on friction draft gear, realized that the use of friction gear is by no means general, and also that while a number of road tests showing the stresses to which trains are subjected have been made, there is little reliable data which shows the frequency of the high pulling and buffing strains in road service. The whole question is quite complicated, as it should take in the question of the influence of heavy steel equipment with friction gears on the older light capacity wooden equipment with spring gears.

The replies in general seem to be based on the capacity of the gears now on the market, a decided preference being expressed for a capacity of about 150,000 pounds. At present the better types of spring gears have a capacity of about 60,000 pounds, and absorb practically no work, the compression being sent back into the train as recoil. The ordinary pulling and buffing forces when train is in motion do not usually exceed 40,000 pounds when train is handled by one engine, but there are shocks due to engines coupling on trains, yard switching, etc., which are of frequent occurrence and often exceed 100,000 pounds. When there is a lack of attention in gravity yards and brake maintenance and operation is faulty, stresses of 600,000 pounds have been exceeded, and on road brake tests with the maximum poor conditions stresses of 500,000 pounds have been recorded.

In general the car framing, draft gear and attachments should be considered not only for the home road but also with reference to conditions on roads with which the cars will be interchanged. In case cars are subjected to small stresses, a low-capacity draft gear equal to these stresses is more satisfactory than a high-capacity gear of same travel, as in the latter case there will be more shock transmitted to the car framing, because the small shock is taken up in a short travel in the high-capacity gear. From these considerations 150,000 pounds seems to be a desirable capacity for general service where cars of all types are made up in the same train. Roads handling heavy trains of steel cars loaded with coal, ore, etc., and not interchanging these cars, may find it advantageous to use gears having a capacity of 300,000 pounds or more with the present travel, as experience has shown that on the better class of modern steel cars the attachments are amply strong and the car framing is sufficient in strength to stand severe shocks. It would be inexpedient to make equipment wreck proof, when there is still much to be accomplished in the improvement of braking conditions, such as better maintenance of the brake apparatus and more careful handling by the train crews.

The distribution of work in the friction draft gear is a more important factor than the maximum capacity, for it has been shown by tests that with two gears, one of which has a much higher capacity than the other, the first by reason of its distribution of work transmits more shock to the car framing than does the second, the maximum capacity of the first being 50 per cent greater than the second. As has been previously stated, the vast majority of the shocks in the train when brake equipment is in good condition and properly handled are not much more than the maximum tractive power of the engine, which on an average is about 40,000 pounds. From this it follows that a friction draft gear should have a capacity of 30,000 to 40,000 pounds in the first 1 to 1½-inch travel, and then the capacity should be increased to a maximum which with present travel it is believed should be from 150,000 to 200,000 pounds. Experience has shown that with much more capacity than the above with the present travel the transition from the preliminary spring action to the frictional operation is not smooth, and transmits severe shocks to the attachments and car framing. Therefore, the results from gears of 300,000 pounds capacity are often less satisfactory than those having 150,000 pounds, assuming the diagrams similar in relation to release.

In this respect, providing there is smooth action in the compression, the friction gear has a unique advantage due to the absence of large recoil, the work being absorbed in the heating and wearing of the friction surfaces instead of being returned to the train, as is the case with spring gears. However, there should be sufficient recoil to release the gears promptly, as some gears have been found jammed and failing to release.

The advocates of increased travel should consider that 150,000 pounds capacity is in general sufficient with the present travel when the gear is satisfactorily designed, in view of the fact that the majority of cars with which they run have draft gears of only 60,000 pounds capacity.

The reduction in damage to cars and contents by the use of friction and other improved draft gears is one on which little definite information is available, for the improved draft gears have generally been placed on cars of stronger underframe construction and with heavier attachments for the draft gear. A number of lines, when rebuilding old equipment, have used the stronger draft gear, and so were able to form an opinion on the resulting benefit due to the newer construction. Again, some roads have constructed large numbers of cars and applied different draft gears to the same lot of cars, and from the repair costs were able to determine with considerable accuracy the efficiency of one type of gear over another in reducing damage to cars and contents in the yards and on the road. Nevertheless, the full value of the improved draft gears is not always apparent, for, together with their introduction, conditions have developed in handling cars on the road and in the yard which has increased car damage to such an extent that the value of improved gears is somewhat obscured.

The increased weight, length of trains, and heavy motive power, together with the introduction of gravity yards, has undoubtedly influenced the use of the improved draft gears, and those roads using heavy trains of steel cars in the coal and ore trade have found it necessary to adopt friction gears. At the same time the roads using the heavier equipment are being compelled either to replace the draft gear and attachments on the older equipment, or to retire this equipment altogether.

The longer trains and heavier motive power has brought forward certain problems in train handling which as yet have not been entirely solved, and tend to make the requirements on the draft gear more severe. The classification of cars by gravity brought at first a sharp increase in car damage, and a consequent call for improvement in draft gears, but it is felt that, owing to the rapid introduction of steel equipment with the higher capacity draft gears, and also to the bettering of yard conditions in handling cars, this damage will become less prominent in the future.

No definite figures can be obtained concerning the variation in the cost of maintenance in the draft gear itself comparing the older spring gears with the modern spring and friction types, as the weaker gears, draft attachments and cars themselves are liable to be in more or less worn-out condition. It is found that the modern wooden cars with the improved gears are very seldom shopped for draft gear repairs, but a large proportion of bad order cars are of the older type, and the damage can generally be traced to the weakness of the draft gear. The old single spring having a capacity of often less than half the tractive power of the engine is easily compressed and then transfers hammer-blows to the car framing, resulting in large renewals of springs and attachments.

Renewals to the friction gear have been due to broken casings, springs and occasionally friction blocks, but this breakage has not been a serious factor with the better class of gears, in fact many gears have been found in good condition and with their capacity unimpaired after five or six years hard service. The breakage of springs is due to heavy loads imposed in a relatively short travel, but even with these springs broken it is found that some friction gears have a capacity equal to that of the twin or tandem spring gears.

The condition of friction draft gears jamming and failing to release is not a general one and has been found in only a few types. The reduction in capacity is due more to broken springs than to wear of the friction surfaces, as it is found in some cases that when the springs are in good shape the old gear has a higher capacity than the new gear, due to the friction surfaces having taken a bearing. The broken casings were found largely in the first gear put on the market and the points of weakness when found were reinforced, so that little difficulty is now experienced in this direction. It is felt that the sticking of gears in compression is due to the combination of insufficient frictional area and too great an angularity in the wedges.

Friction Draft Gear Tests.—To supplement the data furnished by answers received to circular of inquiry relating to a standard maximum capacity and the desirable resistance during each ⅛-inch compression, static tests were made of new and old gears of types most largely found in service. Twenty-seven gears, furnished by different railroads, representing five types, were tested, and of this number nine were new, the others having been in freight car or locomotive service from a few months up to five or more years. Each type is denoted by a letter and in the two types having more than one pattern, the difference is denoted by adding a subscript to the letter. The tests were made on a 300,000-pound screw machine, increments of load being applied in the usual manner and the readings of deflection made until the gear became solid when release was made in increments and corresponding readings taken. These results were plotted, in the usual manner, and computations shown on Sheet 16.

Type "A," the tests of which are shown on Sheet 9, is constructed on the parallel friction surface principle, and has been on the market a number of years. Its application is the most extensive of any of the friction gears and it is in general use on a number of roads largely engaged in coal and ore traffic, and has been reported satisfactory. Tests Nos. 1, 2 and 3 are new gears, and 4 and 6 old gears that were on freight cars for a number of years. The gear used in test No. 4 had a broken spring, but with this defect the gear had a capacity equal to that of the better type of spring gears with the additional advantage of only 13.67 per cent recoil. The gear in test No. 6 shows up well for an old gear, and may be accounted for by the fact that the frictional surfaces had become well worn. This type of gear decreases in efficiency when casings and springs are broken, but the difficulty from the first cause has been reduced by improving the design. As far as can be learned the gears do not become inoperative by becoming jammed and failing to release.

Type "B," the tests of which are shown on Sheet 10, is of the angular friction surface type and the new gear has a very irregular compression line largely due to the rough surfaces and the large angle of the wedges. Attention is directed to tests 12, 13, 14 and 15, and to retest of the same gears under numbers 12-A, 13-A, 14-A and 15-A, as shown on Sheet 16.

It is seen that the spring action changes to friction action in about .4 inch, and also on comparing the compression with that of the other gears it will be noted that it is extremely abrupt, irregular and less efficient in cushioning the shock on the car framing than the spring action extended over more travel.

The other gears, types C, D and E, shown on Sheets 11, 12 and 13, are used less extensively than the foregoing ones and little definite information regarding them is available.

Attention is directed to Sheet 14, which shows a typical diagram for each of the gears. It will be seen that there is a wide difference in the distribution of work between the different gears and it is evident that the results obtained in cushioning the shocks will necessarily vary to even a greater extent, due to influences not exhibited by the diagrams, such as wear of friction surfaces, breakage and set of springs and deformed casings.

In view of the above facts, your Committee, while admitting the value of static diagrams in determining certain facts about the distribution of work in friction draft gears, feels that at the present time it would be inadvisable to recommend a standard maximum capacity or to specify how it should be distributed. Were these values now specified within narrow limits it is evident that at the best not more than two types of gears would satisfy the requirements imposed, and this condition is rather clearly illustrated on Sheet 15, which shows graphically the compressions desired by the members of the Association embodied in the replies to the circular, and also the compressions obtained from tests. In these curves it will be noted that only one gear has a compression line which approaches the average of the recommended compressions.

Through the kindness of Mr. A. L. Humphrey, general manager of the Westinghouse Air Brake Company, who has devised a method for testing friction draft gears, data of exceeding interest and value has been available. This test consists in dropping a 9,000-pound weight, working between machined guides, a distance varying from 6 to 24 inches. The draft gear is mounted on a standard follower, supported by standard stops secured to channels by eighteen ½-inch rivets. This test gives a general idea of the relative values of the various spring and friction gears in reducing damage to the car framing, due to improper distribution of compression and excessive recoil. Mr. Humphrey has very generously offered to place this apparatus at the disposal of any members of the Association wishing to make draft-gear tests.

Your Committee has in mind the design of an apparatus embodying something of the above principle, but so arranged as to be applicable to a standard car in order that a close approximation to actual service conditions may be obtained in testing the efficiencies of the various friction draft gears in cushioning the shocks to the car framing. It is also believed that in the event of satisfactory results being obtained from these tests that a standard method of testing friction draft gears may be developed for testing gears on a drop test machine, providing that the conditions on the last mentioned apparatus may be so adjusted as to closely approach those found in the service test, and in this event the test could be incorporated in specifications for friction draft gears, which should be framed as soon as sufficient definite information on the subject has been obtained, and your Committee will continue to work along these lines.

COUPLER SIDE CLEARANCE.

As a result of the topical discussion at the 1907 convention on coupler side clearance the Executive Committee referred this matter to the Coupler Committee. Railroads who have investigated the subject were requested to send results of their tests, but no data was furnished, as they evidently did not consider these sufficiently thorough to conclusively solve the problem. Several methods of testing were then considered with a view of determining definitely the proper side clearance for couplers on freight equipment cars. No tests have been made, but the following plan is submitted for the consideration of the Association, and it will be carried out during the coming year, if it is approved. A train of steel gondola cars of 41 feet, 11 inches coupled length, equipped with couplers having 5-inch total side clearance, is to be operated on a division having a large number of sharp curves, including some of 13 degrees. By means of iron blocks the side clearance can be adjusted from 0 inch to 5 inches, and it is proposed to measure the lateral stresses exerted by the coupler on the various curves with a recording pressure registering device placed on the end sill of one of the cars. The draw-bar pull for the different side clearances on the curves can be obtained at the same time with a dynamometer car. In this manner the side pressures exerted by the draw bar and the relation of tonnage hauled to coupler side clearance, will be determined. From these results it will be easy to determine whether or not flange wear is increased by limiting the side clearance.

Through the courtesy of Mr. A. S. Vogt, Mechanical Engineer of the Pennsylvania Railroad, and Messrs. William Sellers & Co., Engineers, a drawing of a proposed hydraulic side pressure dynamometer is shown on Sheet 17. The principle of this device is as follows: A single annular diaphragm is used, which is clamped between pieces "A," "D" and "E," and which is loaded by piece "C," which in its turn is attached to piece "B.". All of these pieces are in the form of rings. The parts are stayed by thin plates "F," "G" and "H," which are also in the form of rings. The cell is enclosed in a shell fitted with trunnions, and having radial finger-like projections at each end, which form the abutments. The washers, or followers, "I" and "K," are made with similar projections so as to transmit the load to the support. The liquid is confined between the diaphragm and the recess in "A," and this space is connected by means of a small copper pipe to a recording gauge of the Bourdon tube type. The attachment to the coupler and car is shown on Sheet 18. The desired side clearance can be adjusted by placing blocks inside the yoke connecting the registering device to the coupler. As the space containing the liquid is very small the travel of the piston and consequent lateral play of the coupler beyond the desired clearance will be practically negligible. The calibrations will be made from an initial pressure to avoid any errors due to lost motion. The question of purchase of this dynamometer at the expense of the Association has been referred to the Executive Committee, and if approved, your Committee hopes to furnish some definite data on this subject next year.

ATTACHMENT OF YOKE TO BUTT.

There is some dissatisfaction with the present method of attaching coupler yokes to the butts, but to date no other method has been presented which, in the judgment of your Committee, would be an improvement. It has been suggested that additional lugs be cast on the coupler shank to form a pocket for the yoke gibs between these lugs and the coupler butt. The object of the extra lugs is to force the yoke gibs to fit against the coupler butt and thereby avoid placing the rivets in shear. Your Committee assumes that it is expected to deal with couplers without machining and to use yokes as they are forged, which necessarily means some allowance from the drawing sizes. The pocket formed on the coupler shank, unless machined, will not be accurate, which also holds true in the case of the gibs on the coupler yoke. Even with good machining it is difficult to obtain fits of one yoke gib in the pocket, and this difficulty is increased as the two gibs of the yoke must be fitted at the same time. If any motion is allowed, to that extent the rivets are subject to shear, and practical application with any workmanship that is likely to be secured within reasonable cost will result in a certain amount of clearance between the yoke and lugs, however placed, and the stress will be placed upon the rivets until such time as they are worn or sheared enough to allow all parts to come into bearing.

Another suggestion is the use of four short rivets instead of two long rivets, the idea being that the short rivets can be better heated so as to completely fill the hole when driven. Experiments have been made along this line, but no decided advantage to offset the additional cost was found. The present standard providing for 1¾-inch bearing top and bottom for the rivets is a decided improvement over the old design of butts, and the main difficulty at the present time is the relatively poor fit of the yoke to butt and the membering of the rivet holes. If more care is exercised in this fitting it will greatly increase the efficiency of the attachment. To further this end your Committee is designing gauges for the relative location of the rivet holes to the gib bearing surface on the butt and the similar spacing on the yoke. It is believed, however, that the rivet holes in the butts should be drilled or broached to insure better fitting of rivets, and your Committee, therefore, makes this recommendation. A photograph on Sheet 19 shows sections of a number of yokes riveted to coupler butts. No. 1 shows what may be accomplished when special care is exercised, No. 6 illustrates the application of short rivets, and the other four sections are typical of the average repair work. This photograph shows how little attention is usually given to this operation and results in greatly decreased efficiency of the present manner of fastening yoke to coupler butt, and if the question is carefully analyzed it will no doubt be found that the majority of complaints are mainly due to poor workmanship. Inasmuch as 1¼-inch rivets have been recommended practice of the Association since 1905, and as they have been found preferable to the 1⅛-inch rivets, it is recommended that they be advanced to standard.

SUMMARY.

A summary of the recommendations which your Committee offers to be submitted to letter ballot, to be adopted either as Standard or Recommended Practice is as follows:

STANDARDS.

1. That 1¼-inch rivets be used for attaching yokes to coupler butts, and that Sheet M. C. B. 11 be changed to conform to this recommendation, showing 1 5-16-inch rivet holes in coupler butts.

2. That the following be added to third sentence of paragraph 5 of specifications for automatic couplers, "and the rivet holes in the butts must be drilled, or if cored, must be broached out."

3. That all new types of couplers put on the market after January 1, 1909, have a dimension of 9¼ inches from back of coupler horn to inside face of knuckle, and that the face or front wall of coupler have a minimum thickness of 1¼ inches, and that a note to this effect be added to coupler drawings on Sheet M. C. B. 11.

4. That the total lift of the locking pin be not more than 6 inches, and that a note to this effect be added to coupler drawing on Sheet M. C. B. 11.

5. That all couplers must have an eyelet for locking device located immediately above locking-pin hole, so that the recommended links and clevises can be applied, and that a note to this effect be added to coupler drawings on Sheet M. C. B. 11.

6. That the pulling test under specifications for automatic couplers be changed to read as follows: "The couplers must stand a steady pull of 150,000 pounds." "A coupler shall be considered as having failed to stand this test . . . if the knuckle has opened more than ⅝ inch . . . ." "Should either or both couplers fail to stand the prescribed

test, but both stand 100,000 pounds, another complete coupler or pair of couplers shall be provided . . . ."

RECOMMENDED PRACTICE.

1. That drawing on Sheet M. C. B.—B, showing coupler butts, be omitted, as this will be identical with butts shown on Sheet M. C. B. 11.

2. That drawing of uncoupling attachment on Sheet M. C. B.—B be changed to conform to Sheets 1 and 2 attached, and that Recommended Practice for uncoupling arrangements be also changed so as to conform to this recommendation.

R. N. DURBOROW, Chairman,
G. W. WILDIN,
F. W. BRAZIER,
T. H. CURTIS,
F. H. STARK,
Committee.

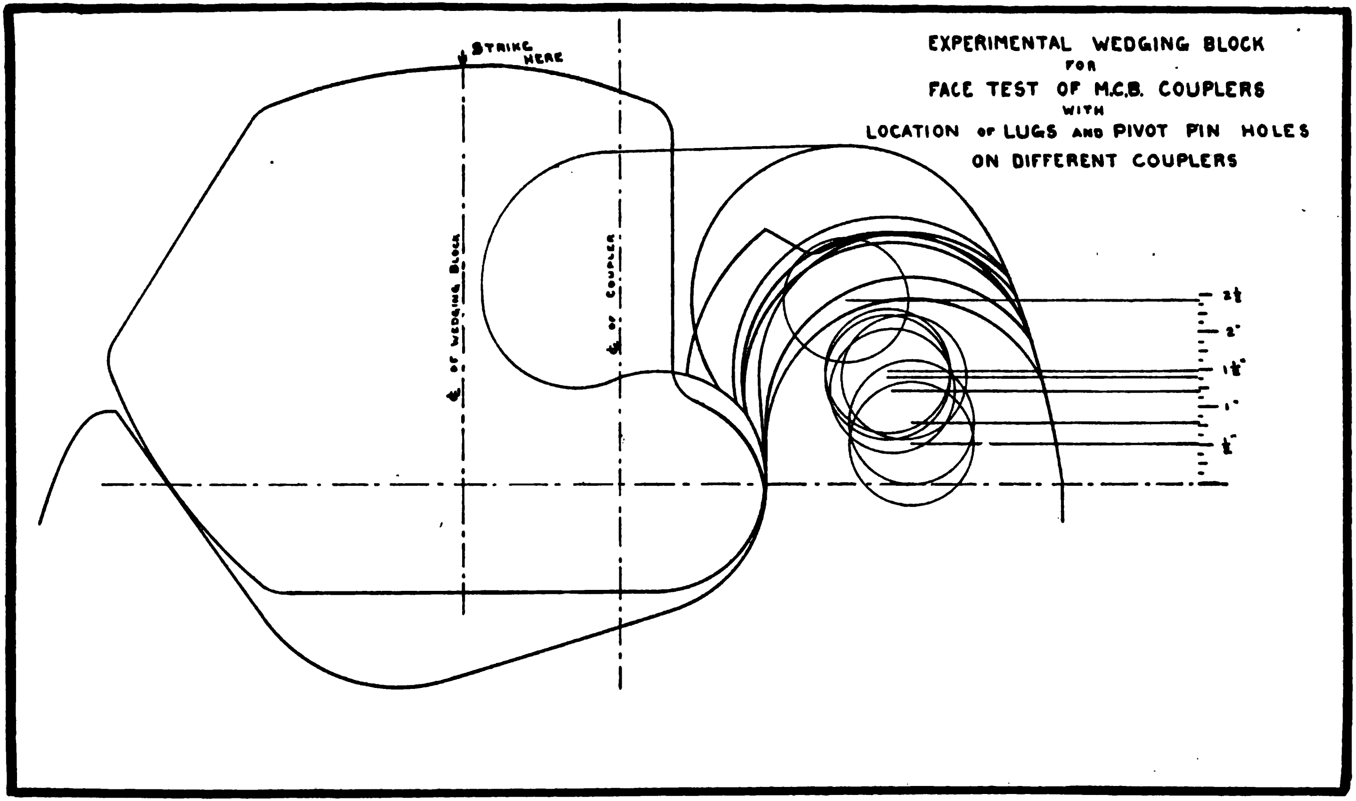
ALTOONA, PA., May 6, 1908.

THE PRESIDENT: What is your pleasure, gentlemen, in regard to the report of the Committee on Reports of Tests of M. C. B. Couplers?

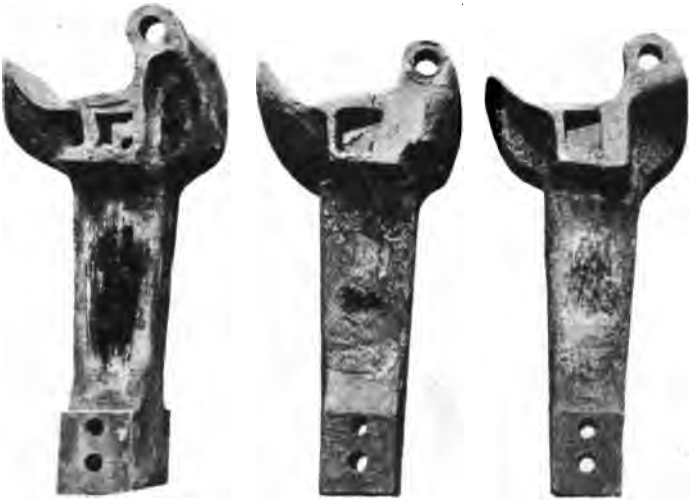
MR. SANDERSON: I do not think there is any more important question before the convention than the subject of couplers and draft gear. We did not get the report until a very short time ago and as it has been abstracted in the reading, it has been impossible to give it full attention during the reading and study it; I move, therefore, that the discussion of the report be deferred and made the first order of business to-morrow morning, so as to give us time to go over it and read and digest it, and be prepared to intelligently discuss it. The hour of adjournment is already past.

THE SECRETARY: Before we adjourn I would like to say that a meeting of the Committee on Nominations will be held in the rooms of the Executive Committee at the Marlborough-Blenheim Hotel at 6 o'clock this evening. Also a meeting of the Special Committee on Standards for the Protection of Trainmen is called for Wednesday afternoon, at 5 o'clock, at the Committee Room at the Chalfonte Hotel.

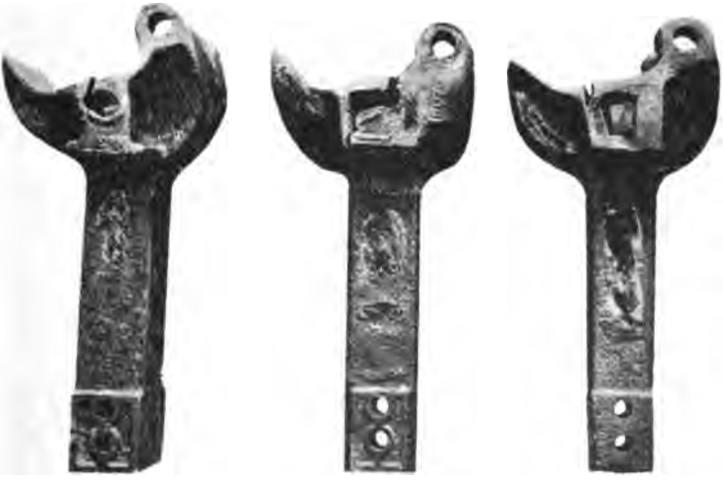
I would also call the attention of the members to the fact that


EXPERIMENTAL WEDGING BLOCK
FOR
FACE TEST OF M.C.B. COUPLERS
WITH
LOCATION OF LUGS AND PIVOT PIN HOLES
ON DIFFERENT COUPLERS
STRIKE HERE
℄ OF WEDGING BLOCK
℄ OF COUPLER
2½"
2"
1½"
1"
½"

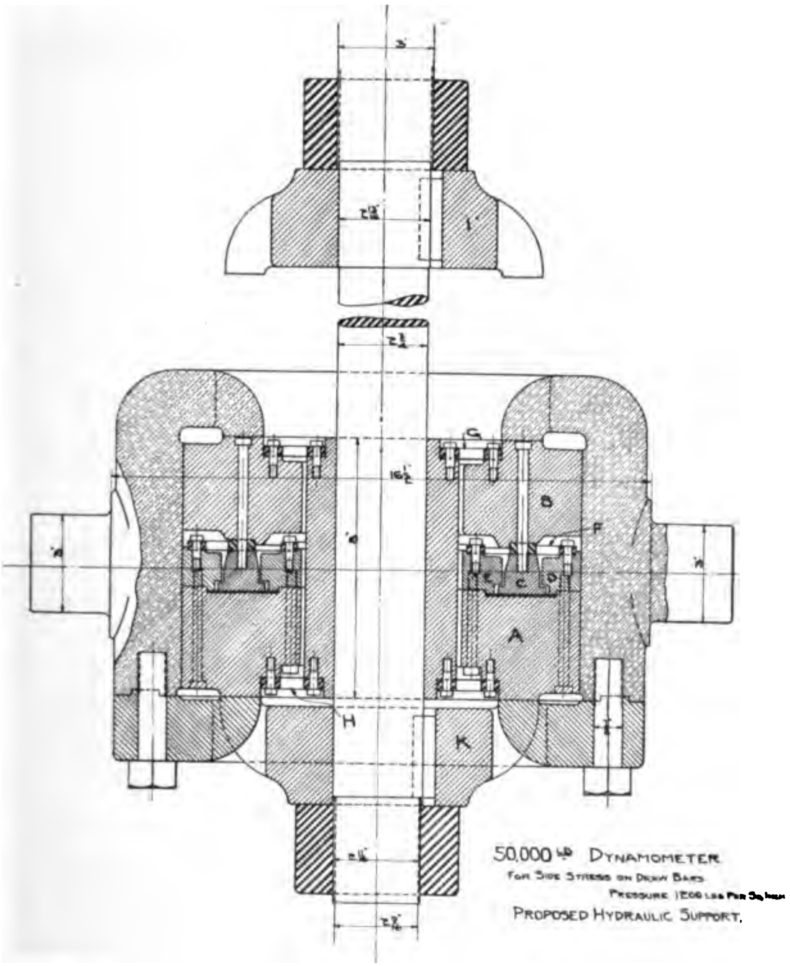
Sheet No. 7-A.



Sheet No. 8-B.



Sheet No. 8-C.


3"
1'
16½"
G
B
F
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D
E
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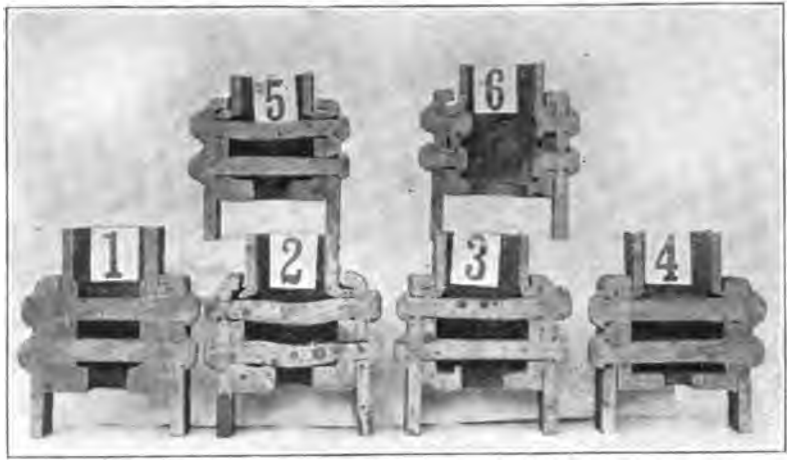
H
K
50,000 lb Dynamometer
For Side Stress on Deam Bars
Pressure 1200 lbs per Sq. Inch
Proposed Hydraulic Support.

Sheet No. 17.



Sheet No. 19.

the sessions on Thursday and Friday mornings begin at 9 instead of 10 o'clock. Please be on hand promptly so that we can dispose of the business before the Association on schedule time.

The meeting then adjourned.

THURSDAY'S SESSION.

President Dow called the meeting to order at 9 o'clock A.M.

THE PRESIDENT: When the meeting adjourned yesterday the report of the Standing Committee on Tests of M. C. B. Couplers had been read, and it was understood that the discussion would be the first thing this morning. Mr. Curtis, who read the report, has some remarks to make to start the discussion.

MR. T. H. CURTIS (L. & N. R. R.): There have been some slight changes made in the cuts since this was published. Turn to page 22, the first sheet, and also to the cut on the next page. You will notice this cut shows the bracket for the uncoupling lever to be slotted. As I said yesterday this bracket is patented, and the patent expires in July, 1908. The cut also shows the bracket secured by bolts and the bolts not central with the bracket. This is also patented. The cut on Sheet 3 shows the holes on the bracket and this is also patented. The committee has prepared a blue-print. Instead of Sheet 1 the committee shows on the blue-print the bracket located in the center of the holes, which avoids one of the patents. On Sheet No. 2 the holes are made round in the place of slotted, which avoids the other patent; therefore, the committee does not present any patented device for the adoption of this Association. This report does not show Sheet 19, which is shown on this photograph, which will be passed around among the members.

I wish to especially emphasize the necessity of close inspection of the attachment of the yoke to the butt of the coupler. It has been recommended by several that we make a change in this standard; but Figs. 2, 3, 4, 5 and 6 show the ordinary work done at shops when the men have not been instructed to do special work, and you will find that the work is not satisfactory. However, on No. 1 it is shown where men knew what was wanted and they did a first-class job; and I feel sure that the attachment of the yoke to the butt of the coupler can be very much improved by some personal work among the blacksmiths and those who rivet the yokes to the butts, to tell them that the rivets must fill the holes and that the lugs must fit tight together. On the Louisville & Nashville R. R. our blacksmiths did not understand the necessity of the rivets filling the holes, but after it was explained to them we had much better work. For my part I believe we have not yet arrived at the point where we need a change in this standard.

The President: You have heard the report of the committee. It is now open to discussion.

Mr. Muhlfeld: Referring to the first paragraph under the caption "Attachment of Yoke to Butt" on page 20, and where Mr. Curtis spoke of the improvement to be made in the connection of the yoke to the coupler butt, I may state that the Baltimore & Ohio has been following this practice for three or four years and we have not found it necessary, in making use of that reinforcement lug to produce a yoke-gib pocket, to do any machining. We have found that the brackets assist very materially in requiring a good fit of the yoke gibs against the coupler butt, and in relieving the shearing strain on the rivets. When we first put the lug on it was a little too low, and we found that the blacksmiths would chip off the lug instead of trying to fit the yoke to the coupler shank. We increased the height and the width, so that it is more of a job now to chip off the lug than it is to get a proper yoke-gib fit. We have found with long and short coupler yokes that the clamping of the yoke gibs in the pockets has relieved the rivets of a great amount of shear. While we agree that the recommendation with respect to increasing the size of the yoke rivets from 1⅛ inches to 1¼ inches is desirable, we also believe that further consideration should be given to the use of the abutting lugs, as from our experience, and which applies to a great many couplers, we have not found it necessary to do any machining in order to make a proper fit. In this connection we consider that, in forming the gibs to the two limbs of the coupler yoke, the practice of bending instead of upsetting the metal should be followed out. From investigations and tests we have made we find that gibs that are upset on the ends of coupler yokes, as well as on truck-arch bars and other similar parts, frequently fail, whereas those which are formed or bent have much greater strength.

With respect to paragraph 6 of the summary of the recommendations for standard or recommended practice, we regret that the committee has not incorporated in this a recommendation to cover the revision of the guard-arm test. As stated in the report, the failures of cast-steel couplers through the face wall in front of the knuckle-lock cavity, as well as at the junction of the guard arm to the body, all of which appear to be due to the guard-arm blow which has been aggravated by the increased but necessary side clearance of couplers at the end sill or striking plate, are items of considerable consequence.

From investigations we have made for the purpose of overcoming these failures, it has been found that the quality of the metal, as well as the cross-sectional area, enters largely into the matter, and we are of the opinion that minimum and maximum limits in the chemistry is desirable, and in fact necessary, in addition to the proposed change in design, in order to insure the proper reinforcement, without the liability for distortion, such as would result in destroying the contour line of the face of the coupler head and guard arm to such an extent as to permit of uncoupling. I think of the two defects the preferable service failure is to break the coupler through the face wall or guard arm rather than to have a low carbon steel which will permit of the distortion of the guard arm and result in uncoupling on the line.

The chemistry of the material is an important element in producing a guard arm that will maintain its contour and at the same time when it does become distorted will cause breakage, so that it will be discovered and taken out of service.

Another essential factor, I think, is the annealing. An examination of couplers that have failed has, in a great many cases, shown that they were unannealed.

I move that the Standing Committee on Tests of M. C. B. Couplers be requested to submit their recommendations to cover a material specification for coupler-head castings which will incorporate the chemistry, or at least, the maximum allowable limit of certain elements, in addition to the minimum and maximum allowable cross-sectional area of metal between the contour face and the knuckle-lock cavity, and at the junction of the guard arm to the body of the coupler head in the essential locations.

Mr. Sanderson: I second the motion.

Mr. R. L. Kleine (Penna. R. R.): I would like to ask Mr. Muhlfeld if he has taken into consideration that the present guard-arm test provides for axial and guard-arm deflection? If the coupler manufacturers use too soft a steel the allowable deflections will be exceeded and the coupler condemned; if the nature of the steel is too hard it will fail by cracking, for which limits are also provided. In the committee's report a face-breakage test is under consideration which will still further increase the physical test requirements and necessitate a mixture of steel of such a nature that will meet these tests, in view of which it is a question if it is advisable to specify a chemical analysis, or whether it would not be best to leave the chemical properties of the steel to the manufacturer, and thus not hamper him in meeting the physical tests prescribed.

Mr. Muhlfeld: I would say that the proposed guard-arm test — which is a spreading test — more nearly meets the actual conditions of service. The present guard-arm test does not represent the condition we get in service when a coupler is actually dealt with, especially on curves, and with the increased lateral clearance that we have at the present time and which is necessary, I think that the proposed test will bring out not only approximately the service spreading action on the guard arm, but will approximate more nearly the actual general condition.

In regard to the chemistry we have found that where we use a low carbon steel the coupler distorts before it fails and the result is keeping that coupler in service and trains parting. If the cross-sectional area of the metal is limited to the proper dimensions and the proper chemistry specified we will maintain the maximum rigidity of the guard arm and at the same time provide for a failure when a certain amount of distortion takes place such as would cause the trains to part on the line of road.

Mr. Kleine: The present guard-arm test provides for limits for the distortion of the guard arm which controls the kind of steel used in the manufacture of couplers, and where a too soft grade of steel is used the allowable limits for spread of guard arm will be exceeded in the physical test and the coupler condemned. No doubt the proposed coupler-face test will also prescribe fixed limits for allowable distortion of guard arm. In view of this, I would like to ask the members whether they consider it necessary to also specify the chemical analysis of the material that goes into the manufacture of couplers so as to limit the allowable amount of distortion.

MR. J. F. DEVOY (C. M. & St. P. Ry.): It may be possible to designate a chemical analysis for a coupler, but I do not understand how you could possibly limit the area of any such. I believe the splitting of the coupler, as shown in the illustration No. 8, and the causes for it, will not permit any designated area to be passed upon. If it is decided or passed upon by this convention that the points shall be changed, particularly to increase it, I believe that it will increase the coupler failures, splitting the head, and at this time it does not appear to me proper that this convention should designate a cross-sectional area of the coupler on that account.

MR. W. E. FOWLER (Can. Pac. Ry.): I hope chemical analyses will not enter into our specifications. I think we are getting into deep water when we do that. We ask the coupler manufacturers to give us a coupler which will give us the required service. We tell them regarding the service we want, and acquaint them with the failures which are becoming more prevalent, and it is to their interest as well as ours to see that the proper chemical constituents enter into the steel of which they make the couplers.

MR. F. H. CLARK (C. B. & Q. Ry.): I agree with Mr. Fowler. I think if we specify the physical tests required, and the dimensions required, that we will do well to leave the chemistry to the manufacturers. I do not think we can specify so many things and expect the manufacturer to take the interest he otherwise would in the improvement of his product.

MR. SANDERSON: On the bottom of page 7 the committee makes a brief reference to the side and bottom operating levers for couplers. I presume they did not go into that further, because so many of the couplers are patented, but my judgment is, after looking into the matter a good deal, that we will have to come to a side-operating device sooner or later, and that it can be safely used if the operating parts are properly shielded or guarded by a projection on the coupler head, and that it should be on the knuckle-pin side of the coupler head, and not on the guard-arm side of the coupler head, as it is less subject to damage on the knuckle-pin side.

With reference to the latter part of the last paragraph on page 10, some time ago the question of the M. C. B. contour lines was up and it was proven to the satisfaction of the convention that the lines were in need of improvement, and the standing committee, as I remember it, was instructed to gradually modify the lines at intervals, so as to work to what was then believed to be the proper line. I think the first change has been made. Reference is made here to the fact that the coupler manufacturers have not conformed properly to that change. That brings out the importance of using the coupler gauges in purchasing both couplers and knuckles, but I would like to ask the committee if the time is not ripe for still further progress toward the final lines.

In regard to the suggestion made by the committee, on the top of page 12, which is referred to in the summary, that the distance from the face of the guard arm to the face of the couplers should be increased half an inch, I think that is objectionable. I am very confident that we will go back, in a short time, to the use of dead blocks. You can shake your head at it, but it will come when you investigate it thoroughly; it has got to come with the steel cars, and I will touch on that later. By adding that extra half-inch length to the head you are complicating the difficulties with reference to the proper length of the dead block and there are a great many roads that use the dead block and believe in it — there are a good many thousands of cars equipped with the dead block. If we are going to have two lengths of heads in service, in applying couplers, that will bring in difficulties. It will be in the nature of class legislation.

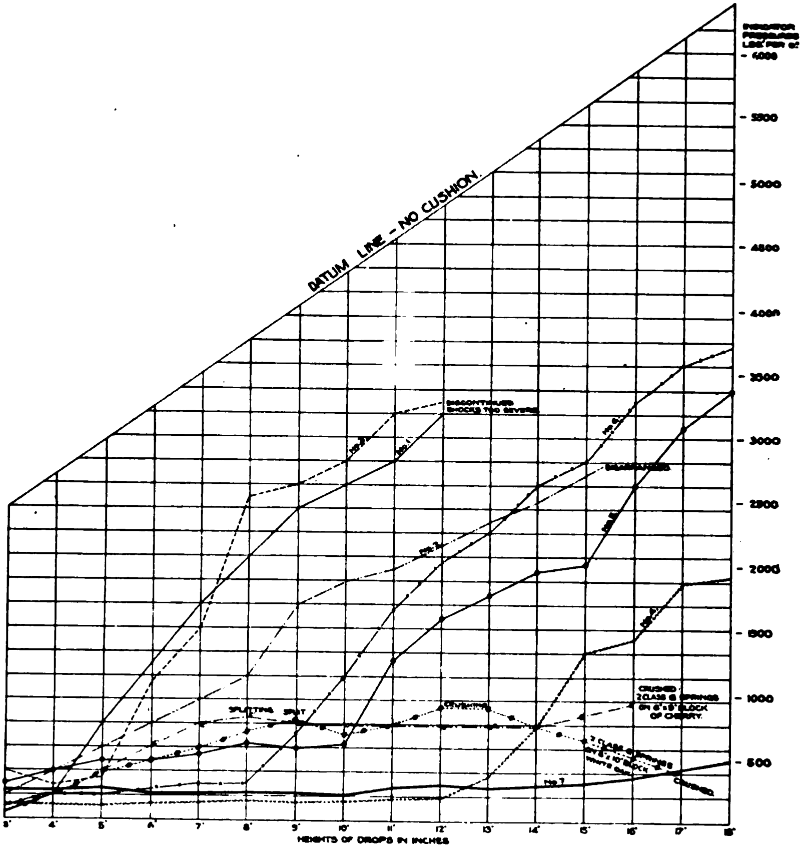
With reference to the friction draft gear I would like to touch on that for a little time. The road that I am connected with now has the problem before it of handling eighty loaded coal cars, of fifty tons' capacity, in one train. That necessitated very thorough investigation into every question connected with the draft gear, couplers, and all the rest of it. I had not believed until recently, that for moderate service friction-draft gears were essential. They might be beneficial but not absolutely essential. I had my doubts as to whether they were really necessary on wooden-frame cars. It was necessary to settle the question, so far as I was concerned, beyond doubt, and I have tried to do it.

I found it rather hard to come to any definite conclusion until the opportunity was given me of making tests, which were briefly referred to in the paper I had the honor of reading before the New York Railroad Club, with which some of you are familiar, and which I will not go over again, by using a 9,000-pound drop test. I was not satisfied at all with the light-drop test. We found that the draft gears did not perform under concussion shocks in a manner that would be proportionately represented by their apparent performance on a static machine, as shown by the diagram on such a machine. The conditions under shock are not the same as the conditions under pressure. Of course I do not mean exactly that; but what I mean is this: the conditions of the gear under such action are not the same as shown in the case of the static diagrams, and while the latter are of interest, they are not of real service in deciding on the efficiency of the friction draft gear. By making the tests with a 9,000-pound weight, and choosing the height of the drop, so that the striking speed is of approximately, or closely, or accurately the striking speed at which cars come together in service, and using a heavy drop, so as to get a heavy mass, thus obtaining similar action to what occurs when a heavy car strikes another (quite different from using a light weight falling from a considerable height at great velocity), and by approximating as nearly as I believe it is possible in laboratory work the actual conditions that the draft gears have to stand in yard service (and that is really where most of the destruction of draft gears is done, we were able to approximate actual conditions very closely.

After making the first series of tests, the *Railway Age* criticized the results, and I was not satisfied with the results in that they left questions of argument open. It was then arranged with a manufacturing concern which had put up the drop test, and turned over the use of it to me, for them to put in a liquid dynamometer under the anvil carrying the draft gears, with a pipe connection to an indicator having one-fortieth of a square inch area, which was the same kind of indicator as used by the United States Government in reading the powder pressures from the breeches of the big guns when they are testing out their smokeless powder in big gun service. I want to say that we exhausted the capacity of that indicator, but we got through. In that way we got automatic records of the shocks, transmitted to the anvil, which, in this case, represents the underframing of the car, by various gears and combinations of springs and gears, etc. The test was very instructive. The height of the drop was gradually raised until the shocks became so severe that it was hardly safe to go any further without the hazard of smashing the foundation out, and I want to say to you gentlemen, if you ever see a 9,000-pound weight come down at a speed representing, say, seven or eight miles an hour, it is very impressive, and it makes you feel as though you had come pretty near equaling the shock and destructive effort which you believe is produced by coupling cars loaded. A diagram of the results obtained is shown on the following page.

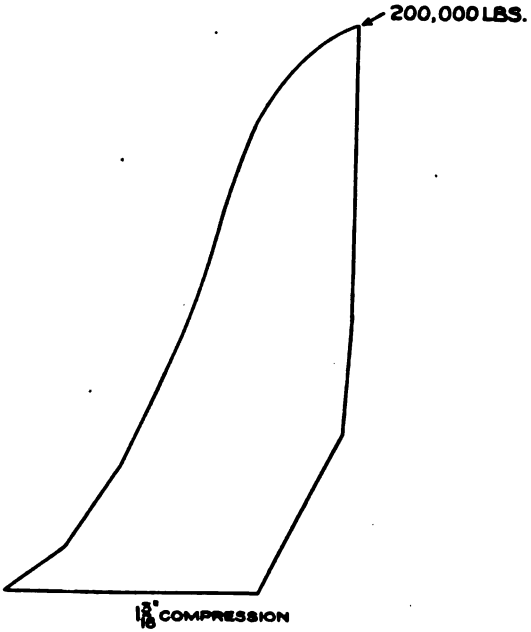
Now, as a result of these tests made in that manner, I found there were very great differences in the effectiveness of the draft gears. I made up my mind that none of us knew very much about friction draft gears, and that it was time to take it up perhaps in this manner, and I would strongly urge that this convention should decide that the Committee on Couplers should put up a heavy drop test of that kind, equip it in the manner mentioned, or at least something equivalent thereto, which will produce results that are directly comparable with service conditions, and develop from such tests as they can make with such an apparatus in the laboratory at Purdue (where it will be removed from all question of the influence of interested parties) a set of specifications for the requirements for friction draft gear to which the manufacturers can work.

At the present time the different manufacturers of friction draft rigging are working on theoretical deductions as to what they believe to be best. I do not think that any of us know, positively, the relative merits of the different gears, but this test furnishes a means of working it out and proving it out, and I never saw anything that convinced me more thoroughly and seemed to satisfy a man of an inquiring turn of mind more thoroughly and completely than these tests, and I would strongly urge that the convention instruct the committee to undertake such a series of tests as that for the coming year.



I want to touch on another thing in connection with it. After getting through with the friction draft-gear tests I wanted to learn something about the dead-block business, and used a pair of class G springs in the regular casing and an oak block, and I got results which were better than most of the results from the friction draft gear, so far as the effectiveness as a cushion in dissipating the effect of shocks transmitted to the anvil is concerned. That is not saying, and I do not wish to be construed to say, that that can take the place of a friction draft gear, because it only acts in compression and can not be very well arranged to act in tension, and you must have the cushion to act both ways to a reasonable extent; but yet I do contend, as the result of the evidence given to my senses in connection with these tests, that it is a very wise thing to use malleable iron or cast steel dead blocks, of proper area, with an oak cushion between them, and a rigid steel frame to take up that portion of the immense shocks transmitted to the steel frame that go entirely beyond the capacity of any conceivable draft gear to dissipate.

I will say further, that to get a better idea of what that oak block actually would accomplish, I put such a block of wood in a hydraulic static testing machine and got a diagram showing 1 3-16 inch compression on 200,000 pounds pressure, which is as pretty a friction draft-gear diagram as you want to see. The diagram is as below:



Now, there is a 30-cent cushion and an effective one, and I claim we are unwise to disregard it, and further I claim that the coupler, especially in view of the fact complained of by certain railroads mentioned here to-day, particularly with reference to the failure of couplers, that the coupler head, as a piece of mechanism, can not properly be made in suitable form to stand the punishment it will get in collision shocks beyond reasonable coupling speeds, and that some protection of the frame itself and of the coupler head is needed, and that it is best provided in the shape of the dead blocks with the oak cushion behind (I would not use them without the oak cushion), but I strongly urge the consideration of the use of them with the oak cushion. They have been used before in the old pattern, but in the drop test, of which I spoke, we found a point at which the oak crushed, and it was very easy to deduce from that the pressure per square inch that it was wise to depend on in using the dead block and oak cushion, so you can increase the base of the dead block in proportion to that information, and figure out the bearing area you should have to withstand any reasonable concussion shock you have to meet. None of us can figure on what a serious collision shock is going to be, such as a yard runaway is going to mean, but let the oak block go, smash it, it only takes 30 cents to replace it. Consider the oak block as a fuse in electrical apparatus — let it burn out, and put in a new one. You can not tell what is going to happen, and you should furnish some safeguard which is reasonably sure to take care of the disastrous smashes that come on the steel frame, and prevent cracking and distortion to a large extent. It may be claimed that the oak will not do it, but when you have made these tests you will see that it will do it. When you can compress a piece of oak that size 1 3-16 inches and it will come back, under a pressure of 200,000 pounds, you can see that you can do it.

With regard to the coupler side clearance; we tried to get at the side clearance that was really necessary to use by laying out the maximum curvature we will have to provide for on the floor of a big warehouse — we worked it out and found we would require 1¾ inches lateral on each side to relieve the wheel flanges of unnecessary strains in curving. That means 3.5 inches total, and with 3.5 inches total clearance it begins to look as if some means were necessary to move the coupler head either backward or forward without going between cars to do it, and I believe the committee ought to take that into consideration for the coming year, and see if some practical method can be devised by which that can be accomplished. We want to keep the men out from between the cars.

I would call attention finally to this diagram, which shows the results in crooked curves of the compression of different gears, class G springs, no spring at all, as plotted from the indicator cards made from this special indicator. The upper line represents a line scaled for the shocks when no springs at all, and no gear or cushion of any kind was used, so that that represents the complete shock; the horizontal line would represent the complete cushioning; and the nearer the lines, the curves approach the horizontal, the more effective will be the dissipation of the shocks — the more effectively will the gears dissipate the shock and perform the service for which they are intended. Down at the bottom you will find the lines of the two class G springs and the oak block. It is not as good as a couple of the other gears, but it beats a good many of them, and I do not think there is anything that can be more conclusive as to the merits of the oak cushion behind the dead block than a careful study of that information or similar information, obtained, as I have obtained this, by personal work.

It has been stated that this laboratory test can be made to show any kind of result. I want to say to you gentlemen if you ever try handling a 9,000-pound weight and try to manipulate it, you have a job on your hands. It won't stay manipulated, and comes down with such a smash that all talk of manipulation is absurd.

MR. J. J. HENNESSEY (C. M. & St. P. Ry.): I wish to refer to side and bottom operating couplers. I am sorry the committee did not give this a little more attention. This style of coupler is being used extensively and is practically standard on some roads. The release rods on top of couplers is something which I think our conventions should take into consideration. For illustration; a load of lumber on a flat car shifts, your releasing device on top of coupler may be in perfect condition, but your unlocking apparatus is inoperative, and it is possible for that load to shift so far that it practically makes both couplers inoperative. With the releasing apparatus of coupler operated from underneath, such shifting of the lading would not affect the releasing apparatus of the coupler. Again there is a large class of cars, called carriage cars, where the whole end opens out in doors. A great many furniture cars and smaller box cars are similarly fitted. That is a weak construction, because if the lading shifts a little it pushes these large end doors out, and consequently, your device on top of coupler is again inoperative. By the underneath releasing arrangement or side lift, as it is commonly called, you practically do away with the chain, and I think there is nothing in the coupler operation more annoying to car men than the chains and clevises getting out of order.

Mr. Brazier (N. Y. C. & H. R. R.): As a member of the Coupler Committee, I will say that it is well known by the members of the Association that the work of this committee is very important. Its work means a great deal to the members of the Association in dollars and cents. The maintaining of our M. C. B. couplers is of the greatest importance. To the members of this Association who are not on committees, I would say they have no idea of the amount of work which is performed by some of the standing committees. The Coupler Committee during the past year has given very close attention to the work; we have had at least three men employed for over three months getting together data and useful information. One of the members spoke yesterday of getting the reports into the hands of the Secretary in advance so that they can be printed and circulated prior to time of the meeting. Permit me to say, that the Executive Committee, as well as the President of this Association, has endeavored to get committees to make prompt reports, and unless you have been on a committee, you can not realize what it means to get these reports in promptly.

I have signed the report of the Committee on Couplers, as a member of the committee, and yet there are a few things I would like to say in connection with the report.

The Coupler Committee has made a very thorough investigation of the condition of uncoupling arrangements and also of failures of couplers caused by railroad companies not buying couplers to the recommended specifications of the Association, also by not having them given the M. C. B. test.

The committee has shown recommended changes in the uncoupling attachments which go far toward reducing the number of parts we are now using, also in strengthening the weak parts.

I am of the opinion that a straight uncoupling arrangement can be made applicable to the couplers, as recommended by the Coupler Committee, that would do away with many of the undesirable features of the overhead uncoupling arrangement.

It is a well-known fact that the overhead coupling lever can not be used under all circumstances. Cars that are used in construction work, where an iron apron is used over the couplers, prohibits the use of overhead uncoupling lever. Many locomotive tenders are equipped with buffers, so that when they are coupled onto freight cars with overhead uncoupling arrangements, they either make them inoperative or they can not operate them.

It is my purpose to call your particular attention to page 7 of the committee's report on the side and bottom operated couplers. No one believes in standardizing parts of cars or maintaining standards more than I do, yet we all learn by experience, and I am positive if we carry out the recommendations made by the Coupler Committee to make tests of side and bottom uncoupling lever that a straight side uncoupling rod can be applied with less parts than the overhead. The coupler can contain all of the recommended practices of the Association and I believe the side uncoupling lever, or one that requires a direct pull to be made on the uncoupling rod in order to operate it, is better than the overhead arrangement, which requires the brakeman to run along the side of the train and lift the uncoupling lever in order to operate it. It would seem to me it would be safer for him to have a pull arrangement which would keep him away from the moving train; it would be better, safer, cheaper to maintain and make operative in all cases, more so than the overhead attachment.

It is true that in the past we had one make of side uncoupling lever which was not just satisfactory, but there are thousands of couplers running to-day with the side-operating rods that are a success and can be applied by having only two parts, the rod and the attachment to the end sill; while with the overhead uncoupling lever we have two brackets to hold uncoupling rod in position together with the chain and clevices.

Although I am a member of the Coupler Committee and have signed the report, as it contains so many good features, I particularly want to call attention to this lever feature so that we can make further experiments on the same, and see if we can not get better results with the side than we do with the overhead.

I believe the greatest chance of the cars being damaged, and being sent to the repair tracks, is on account of the uncoupling chains, and the committee has made some recommendations which are excellent if carried out, and I believe it will reduce the cost of maintaining couplers if we carry out the Coupler Committee's recommendations.

I want to emphasize what Mr. Sanderson has stated about dead blocks. If we are going back to using dead blocks I believe it is unwise unless all cars could be equipped with them, as it is now unnecessary with our present M. C. B. couplers to go in between cars to couple or uncouple the cars. Possibly suitable dead blocks would save the draft attachments.

MR. MARDEN: I want to say a word in regard to the uncoupling device on M. C. B. couplers. I am thoroughly in accord with the suggestions for improvements in these parts, from the fact that the breakage of uncoupling chains is a serious matter, and I would be very glad to see a side uncoupling device adopted for couplers. In regard to the dead blocks, I have always been a believer in dead blocks. Mr. Sanderson and I may be " back numbers," but I believe with him that you gentlemen will come to the dead blocks sooner or later. While I have not made the extended tests that Mr. Sanderson has, about nine years ago I built one hundred 80,000-pounds capacity box cars and equipped them with the M. C. B. couplers and spring buffers. I issued instructions to all my foremen and inspectors to report to me any damage occurring to these cars. The reports indicated that these one hundred cars have cost the road with which I am connected fifty per cent less for repairs than any other one hundred cars we have running.

Mr. Schroyer: We are not talking on any motion to accept the report of the committee or anything. I move that the report of the committee be accepted and referred to letter ballot.

The President: Mr. Muhlfeld's motion is before the house. Will you state your motion, Mr. Muhlfeld?

Mr. Muhlfeld: Practically, that the committee give their recommendations for the desired chemistry of cast-steel couplers, for the minimum and maximum allowable area at the face and guard arm connections of the coupler body, and that further consideration be given to the application of a reinforcing or abutting lug on the shank of the coupler for the yoke-gib fit.

Mr. Schroyer: That is, that a committee be appointed?

Mr. Muhlfeld: No, sir; that the present committee consider this.

Mr. Schroyer: I think that motion is out of order, because this committee has done with its work in so far as this meeting is concerned.

Mr. Muhlfeld: This is a standing committee, Mr. President.

The President: The motion of Mr. Muhlfeld is in order.

Mr. F. H. Stark (Pittsburgh Coal Co.): In view of the motion, perhaps our discussion is a little off from the text. However, as a member of the committee, I want to say a few words. As Mr. Brazier said, it is no easy task to master such a proposition as the committee had before it. We have had several meetings of the committee which have been largely attended. The work has been conducted by experts and I believe we are warranted in stating, even though I am a member of the committee, that there has been some progress made.

As to the question of embodying in the specifications the chemical analysis, we all know we had a great deal of difficulty in providing the analysis as well as physical test for axles. The axle makers absolutely refused to abide by both. If we provide a physical test, it seems as though we should leave it to the manufacturers who make a study of it to make the analysis.

So far as changing the contour is concerned, it is quite evident that the time has not arrived to do this, for the reason that all the railroads are not buying new couplers to-day with standard contour, hence we must first reach that point before we make another change.

So far as the operating lever is concerned, I wish interested parties would go home and ascertain what causes the failures. It will be a revelation to you. You will find that it is not all shifting loads. There is only one load of timber or rails where there are hundreds of other cars containing other products, and yet you have these operating chains out of order. You will find that on many cars the chain bunches in the head of the coupler and the movement of the coupler breaks the chain; and then there is the cornering of cars. You will find in switching that cars shifted in on a track and another car follows to go on to the adjacent track, the preceding car does not travel fast enough, the second car overtakes it, often breaking off the angle cock or damaging the coupler operating rod or brackets. I think that a side attachment, suspended on brackets or hangers of some sort, would be put out of commission far more often than the overhead uncoupling arrangement, hence, unless we can have a side uncoupling attachment that can stand all kinds of abuse, we want to go a little slow. I will admit that if we had some flexible arrangement, possibly a wire cable that will stand being bent repeatedly, possibly that would be a move in the right direction, but the committee does not feel that the time is ripe to make any radical change, but would rather let the members make tests of their own.

Mr. Marden spoke of a hundred cars. A hundred cars are lost sight of, and you will never get a satisfactory conclusion from a hundred cars.

In regard to the dead block, perhaps we will go back to them, but most people who have had any experience with these have taken them off. I would like Mr. Sanderson to tell us the elastic limit of the dead block to which he referred, how many times the wood can be compressed and return to original thickness. It seems to me we would have a piece of dead material in there after it is in service a short time.

The committee has in mind the tests suggested by Mr. Sanderson, and the plans of the committee, as outlined, will take in all these laboratory tests Mr. Sanderson refers to, and the reason they have not already accomplished more is because the time has been too short; and if you will trust the committee for another year, we assure you that laboratory tests will be made and verified by service tests as far as possible.

MR. SCHROYER: I am going to vote for the report of the committee, but I am not going to do it because I think the uncoupling apparatus which they propose here is the best that could be had. I do not. I want to know what causes the dissipation of this coupling apparatus. Every time this apparatus is coupled to a passenger car, the buffer face plate of the car will distort or destroy that overhanging rod. The great cause of breakage of links and clevises is due to the fact that they are made of malleable iron, and malleable iron is much more reliable than steel. We have been up against the prejudice against the use of cast steel, and other steel construction, because of its unreliability. The manufacture of steel has been gone into so thoroughly in the last few years that we know reasonably well now what we are getting when we are buying steel, and for that reason I am not in favor of a specification which embodies the chemical analysis of the steel that is being used, because I do not believe it is a fair thing to the maker to lay down a formula by which he shall make the steel, and then require that the steel made by that formula shall stand a certain physical test. That is drawing the lines pretty close on the manufacturer, and I hope that that motion regarding the chemical analysis will not prevail for that reason. I am strongly in favor of deadwood blocks on cars, and I favor the use of a wooden dead block, whether it is on a steel or a wooden car. A wooden block has the element of absorbing shock without destroying that which is back of it, to a much greater extent than any metal we know of, and I am in favor of it from the standpoint of uncoupling economy, in the damage that is done to cars when the drawbars are broken out and they come together without wooden dead blocks between them. The deadwood blocks will hold the cars apart a sufficient distance to prevent the running boards being destroyed, and the brake staff and other parts of the car from being destroyed, and if for no other reason cars should have wooden dead blocks. In the case of a steel car, a wooden dead block is essential to obtain the best results. We know these cars frequently receive shocks of 300,000, 400,000 and 500,000 pounds, and these shocks often exceed 500,000 pounds. There is no draft rigging having a spring resistance or friction resistance that will withstand any such blow as that, and all blows that steel cars receive over and above that which they are able to absorb in the draft rigging must be received by the rigid part of the car — and the steel cars are supposed to be rigid — and it is that blow which will cause and is to-day causing the damage to our steel-car construction, so that for that reason I am in favor of wooden dead blocks.

THE PRESIDENT: The hour has arrived for the consideration of the report of the Arbitration Committee.

MR. MUHLFELD: Referring to the motion before the house, which has been seconded, I tried to cover the points that result in coupler and yoke breakages and failures. These are the points that I think this Association should deal with, because they involve reinforcements that will prolong the life of parts which pertain to interchangeability, and which will reduce operating costs and facilitate interchange of equipment. That is what the railroads all over the country desire and are in need of.

Referring to the criticism in relation to specifying the chemistry, I may state that railroads generally to-day specify the chemistry and tests for materials such as rails, axles, crank pins, tires, piston rods, boiler and fire-box plates and tubes, pipe billets, bars, shapes, springs, rivets, wire, miscellaneous sheets, steel castings, and charcoal and coke pig iron. I do not see any reason why couplers should be excepted from the chemical analysis. It seems to me that to-day the failures in couplers are causing a considerable unnecessary increase in costs for operation. These are the points I have tried to cover.

MR. SANDERSON: I move the discussion on this subject be suspended until after the discussion of the Interchange Rules.

(Motion carried.)

(First Vice-President McKenna in the chair.)

THE CHAIRMAN: Gentlemen, the chairman of the Arbitration Committee, Mr. Hennessey, will present the Arbitration Committee's Report.

MR. HENNESSEY: Mr. President and Gentlemen: The Arbitration Committee's report is now in your hands, and we will not attempt to read it. We had a large meeting yesterday of representative members who kept the committee for three or four hours. We did not appreciate it much, but we stuck to our jobs, and a few changes were made in the report, which will be read by the Secretary. These changes were agreed to by the Arbitration Committee as well as by the representatives of various railroads who were present.

The original report with the proposed amendments is as follows:

REPORT OF ARBITRATION COMMITTEE ON (1) CASES ARBITRATED; (2) REVISION OF RULES OF INTERCHANGE.

To the Members:

Decisions Nos. 704 to 738 have been rendered by your Committee during the year just closed. Distribution has been made to the members as has been the custom, and a copy is submitted herewith for your approval.

Your Committee has considered the various recommendations as to changes in the rules, as submitted by the members and clubs, and herewith is given the approval or disapproval of your Committee. The proposed additions to the rules are shown in italics, and where no changes have been thought desirable no reference is made to the rule. These changes refer to the 1907 Code.

PREFACE.

Mr. J. H. Manning, S. M. P., D. & H. Co., suggests that the rules be made plainer in regard to liability of delivering company for improper repairs of delivering company's defects when such cars do not carry either a repair or defect card, and recommends that the following be added:

"*Items of improper repairs of delivering company's defects shall be covered by defect or repair card attached to car on all cars offered in interchange.*"

Mr. O. B. Englisch suggests that rule be changed to read:

"Railroad companies handling cars should make the necessary repairs to such cars at their own expense except where the delivering company is responsible or damage was the result of an inherent defect in the car."

Your Committee can not see its way clear to make so broad a recommendation at this time.

RULE 1, PAGE 2.

The Pittsburgh Railway Club suggests adding the words "and adjusting brakes" in the third line after the word "inspection," and omit the word "and" before the word "inspection."

Mr. C. S. Morse, M. C. B., W. & L. E. R. R., makes a similar suggestion.

This suggestion is approved by your Committee.

RULE 2, PAGES 2 AND 3.

Mr. J. W. Marden, S. C. D., B. & M. R. R., suggests that the return card be abolished.

Mr. W. R. McKeen, Jr., suggests changing first sentence to read as follows:

"*Old-style freight cars of 40,000 pounds capacity or less, having less than six longitudinal sills that do not measure in cross section 5 by 8 inches or more, and that are not equipped with four truss rods of not less than one inch in diameter, and draft timbers that do not extend through the body bolster at least 20 inches, and do not have both front and back lug forming a unit casting, must not be offered in interchange.* All other cars offered in interchange must be accepted in safe and serviceable condition; the receiving road to be the judge in cases not provided for in Rules 3 to 56, inclusive."

This is necessary owing to the risk of damage incident to the breakage of these cars while being handled in trains with our heavy steel equipment and modern freight locomotives.

Mr. F. E. Davisson suggests that return card be made 4 by 4 inches and printed in color to distinguish it from other cards used.

The Railway Club of Pittsburgh suggests inserting after the word "form" in the fourth line of second paragraph "*filled in with ink or black indelible pencil,*" to conform to the requirements for defect and repair cards. It also suggests changing the name of card to "*Bad Order* Return Card."

The Joint Car Inspectors' and Car Foremen's Association suggests making the return card same size as M. C. B. Defect Card, namely, 3½ by 8 inches, the color to be yellow and printing black to distinguish it from the defect card.

The Western Railway Club suggests making size of card 3½ by 8 inches.

Mr. C. S. Morse approves the suggestions of the Railway Club of Pittsburgh.

Mr. H. J. Small suggests that the following be added:

"Old-style freight cars of 40,000 pounds capacity or less, having less than six longitudinal sills that do not measure in cross section 5 by 8 inches or more, and that are not equipped with four truss rods of not less than one inch in diameter, and draft timbers that do not extend through the body bolster at least 20 inches, and do not have both front and back lug forming a unit casting, must not be offered in interchange, and the receiving road reserves the right to reject any and all such cars."

Your Committee approves of the suggestion of the Pittsburg Railway Club as to filling in the return card with ink or black indelible pencil, and the Western Railway Club as to size of card, viz., 3½ by 8 inches. The other suggestions are not approved.

RULE 3, PAGES 3 AND 4.

The Railway Club of Pittsburgh, also Mr. C. S. Morse, suggest changing the car number and initials from top to bottom of card to assist bill clerks and others who examine defect cards when bills have been rendered.

The Western Railway Club and Car Foremen's Association suggest omitting all reference to the brake staff.

The suggestion of the Railway Club of Pittsburgh is approved. Inasmuch as inspectors are familiar with this description of the ends of car it is not thought advisable to make any change in the rule. The last suggestion is not approved.

RULE 4, PAGE 4.

Mr. J. H. Manning, S. M. P., D. & H. Co., suggests that in order to harmonize with recommendation made in preface to rules that the following be added, *"and cars in interchange with improper repairs of delivering company's defects not covered by defect or repair card."*

The Southern & Southwestern Railway Club suggests that delivering road should be required to furnish defect card for improper repairs unless the car bears a card or other evidence that the improper repairs were not made by it. This would enforce the application of repair or defect cards by the road that actually made the improper repairs.

Mr. R. E. Smith suggests that this rule be modified to require delivering road to furnish defect card for improper repairs unless the car bears defect card or repair card showing who made the wrong repairs.

Your Committee can not approve any of these suggestions.

RULE 5, PAGE 4.

Mr. W. R. McKeen, Jr., suggests that last sentence be changed to read:

"And on all steel cars to cardboard, located on crosstie under car, or on *outside* of *center* sill, *between center of car and body bolster.*"

Your Committee believes the present provisions of the rule are satisfactory.

RULE 7, PAGE 5.

The Western Railway Club suggests changing rule to read:

"Shelled out: wheels with defective treads on account of pieces shelling out: if the spots are over 2½ inches or are so numerous as to endanger the safety of the wheel *on cars of under 80,000 pounds capacity and 2 inches on cars of 80,000 pounds capacity and over.*"

Your Committee can not approve this suggestion.

RULE 8, PAGE 5.

The Railway Club of Pittsburgh suggests changing the first part of rule to read:

"*Any seams* at a distance of one-half inch or less from the throat of flange, or seams 3 or more inches long on any point of the tread."

Mr. C. S. Morse suggests changing rule to read:

"*Any seam* at a distance of ¾ *inch* or less from the throat of the flange, or seams *2 inches* or more long on any other point of the tread."

Your Committee does not approve either suggestion, but would recommend that the rule be changed to read:

"Seams ½ inch long or over at a distance of ½ inch or less from the throat of flange, or seams 3 or more inches long on any other point of the tread."

RULE 9, PAGE 5.

The Western Railway Club suggests revising the rule to read:

"Worn through chill: when the worn spot exceeds 2½ inches in length *on wheels of cars under 80,000 pounds capacity and 2 inches on cars of 80,000 pounds capacity and over.*"

Your Committee does not approve this suggestion.

RULE 10, PAGES 5 AND 6.

The Southern & Southwestern Railway Club suggests that two worn flange wheels on same axle should be shown as an owner's defect.

W. R. McKeen, Jr., suggests changing second sentence to read:

"Wheels under cars of 80,000 pounds capacity, with flanges having flat vertical surfaces extending more than ⅞ inch from tread, or flange less than 1 1-16 inches thick. *Wheels under cars of 100,000 pounds capacity or over, with flanges having flat vertical surfaces extending more than ⅞ inch from tread, or flange less than 1⅛ inches thick; see figures 4, 4a, 4b, 4c and 4d.*" Balance of rule to remain.

Your Committee does not approve either of these suggestions, but would suggest that the rule be changed to read:

"Worn flange: cast wheels under cars of less than 80,000 pounds' capacity, with flanges having flat vertical surfaces extending more than 1 inch from tread, or flange *15-16* inch thick or less *gauged at a point 17-64 inch above tread.*

"Wheels under cars of 80,000 pounds capacity or over, with flanges having flat vertical surfaces extending more than ⅞ inch from tread, or flange less than *1 inch* thick *gauged at a point 17-64 inch* above tread." Balance of rule to remain as at present.

The Western Railway Club suggests adding a note as follows:

"*Loss of service metal from steel-tired wheels as a result of sliding to be measured from point where slide begins. One-sixteenth inch of metal to be allowed for flat spots under 2½ inches long, and one-eighth inch of metal to be allowed for flat spots 2½ to 3½ inches in length, both inclusive.*"

The suggestion of the Western Railway Club is not approved.

RULE 11, PAGE 6.

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest changing the dimension of thick flange from 1 7-16 inches to 1 19-64 inches, and change Fig. 2 to show the new maximum flange thickness gauge.

Mr. W. R. McKeen, Jr., suggests changing rule to read:

"Thick flange: flange over 1 7-16 inches thick *for cast-iron wheels, standard of 1903, 4, 5 and 6, or flange over 1 19-64 inches thick for cast-iron wheels having increased flange and tread, standard of 1907 (see Figs. 2 and 2a).*"

Your Committee approves the suggestion of Mr. McKeen and has recommended to the Wheel Committee that it redesign the present maximum flange thickness gauge to cover both dimensions.

RULE 14, PAGE 6.

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest adding the words "*cracked or*" before the word "broken" in the first line.

Your Committee approves of this suggestion.

RULE 17, PAGE 6.

Mr. W. R. McKeen, Jr., suggests that rule should show gauging points for wheel with increased flange and tread. Fig. 6a.

This suggestion is approved, and your Committee has recommended to the Wheel Committee that it redesign Fig. 6, page 11, to conform to this suggestion.

RULE 18, PAGE 6.

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest omitting the words "if chip is on outside of flange" and insert "if chip is on the *opposite side from throat of flange.*"

Your Committee approves of this suggestion.

RULE 19, PAGE 7.

Mr. C. A. Schroyer suggests 2½ inches on cars of less than 80,000 pounds capacity and 2 inches on cars of 80,000 pounds capacity and over.

The Western Railway Club makes a similar suggestion. Should the changes proposed in Rules 7, 9 and 19 meet with the approval of the Club, a change should be made in the wheel defect gauge (Fig. 1) to measure the small size flat spot.

The Central Railway Club suggests adding to first sentence "on cars of 60,000 pounds capacity or under, or if the spot caused by sliding is 2 inches or over in length on cars in excess of 60,000 pounds capacity."

Your Committee can not approve either of these suggestions.

RULE 21, PAGE 9.

The Railway Club of Pittsburgh suggests that the gauges in Figs. 1, 3, 4, 4a and 5, be so changed as to eliminate the throat radius.

Also add a note to Fig 6, as follows: "For wheels cast prior to the new M. C. B. standard tread and flange adopted in 1907."

Also add a new cut showing the manner of gauging wheels with the new M. C. B. form of wheel tread and flange adopted in 1907.

Mr. C. S. Morse concurs in the suggestions of the Railway Club of Pittsburgh, but believes that the gauge openings ought to be maintained as adopted in 1907, i. e., 1 inch, 1 1-16 inches, and 1⅛ inches.

Your Committee approves the suggestions of the Railway Club of Pittsburgh, and has recommended to the Wheel Committee that it submit a standard location of marking with a standard marking for wheels.

RULE 22, PAGE 12.

Your Committee would suggest that the subheading under the caption of "Axles" be changed by omitting the words "defects of," making it read:

"Axles which justify renewal."

It is thought that this wording more clearly defines the intent of the rules following.

RULE 23, PAGE 12.

Mr. W. R. McKeen, Jr., suggests a note as follows:

"All refrigerator cars to have capacity of ice tanks stenciled immediately over side doors."

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest omitting reference to 30,000-pound capacity cars.

These suggestions are not approved.

RULE 25, PAGE 13.

Your Committee would suggest that the subheading under the caption of "Trucks" be changed to read:

"*Parts of* trucks which justify repairs if owners are responsible, or repairs or carding if delivering company is responsible."

It is thought that this more clearly defines the intent of the rules under that subheading.

RULE 28, PAGE 13.

The Railway Club of Pittsburgh suggests a new rule following this, as follows:

"Cars equipped with steel wheels and so stenciled, if found with cast-iron wheels, delivering company responsible."

Also, change Rules 4 and 46 to include the number of this new rule.

Your Committee approves this suggestion.

RULE 29, PAGE 13.

Mr. W. R. McKeen, Jr., suggests changing rule to read:
"Torn air hose, *missing release rods,* defective, missing or worn-out parts of brakes not elsewhere provided for," etc.

The Western Railway Club suggests that retaining valves be made an owner's responsibility when found missing, defective or worn out under fair usage.

Your Committee would suggest that the subheading under the caption of "Brakes" be changed to read:

"*Parts of* brakes which justify repairs."

For the reason given under Rules 22 and 25.

Your Committee also suggests that under this caption the rules be rewritten so that all owners' defects and delivering companies' defects follow each other in sequence.

Your Committee would recommend that rule be changed to read: "Damage to interior portion of cylinder or triple valve, leaky pipes, account of seams, air hose burst from air pressure, torn air hose and defective missing or worn out parts of brakes not elsewhere provided for, which have failed under fair usage; except burst or torn air hose, burst or leaky pipes, account of seams, or missing material on cars offered in interchange."

This change is proposed in order to separate owner's responsibility from delivering company's responsibility by the elimination of the exceptions in Rule 32.

RULE 30, PAGE 13.

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest changing this rule to read:

"Cylinder or triple valves of air-brake cars not cleaned, oiled and tested within twelve months, and the date of last cleaning, oiling and *testing* marked on the brake cylinder, *auxiliary reservoir, or location on car provided for same,* with white paint."

The Western Railway Club and Car Foremen's Association suggest that the word "marked" be changed to "stenciled" and that the word "reservoir" be added, making the rule read:

"Cylinders or triple valves of air-brake cars not cleaned and oiled within twelve months, and the date of last cleaning and oiling *stenciled* on the brake cylinder *reservoir* with white paint."

Your Committee approves the suggestion of the Railway Club of Pittsburgh, but would suggest that the rule be changed to read:

"Cylinder or triple valves of air brake cars not cleaned, oiled *and* *tested* within twelve months, and the date of last cleaning, oiling *and testing, preferably* marked on the brake cylinder *or auxiliary reservoir, or if same is not readily visible, in a convenient location at release rod,* with white paint."

RULE 32, PAGES 13 AND 14.

Mr. F. E. Davisson suggests making this rule read:

"Missing or cut-out air-brake hose, or missing or broken air-brake fittings, angle cocks, cut-out cocks, cylinders, reservoirs, triple valves, release valves and pressure-retaining valves, or parts of any of these items, except inside or concealed parts."

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest adding *pipe* and *release valve rods,* as the delivering company should be responsible for these items missing when offered in interchange the same as other parts of air brakes enumerated in the rule.

Mr. C. A. Schroyer suggests adding "train pipe" after the words "air-brake fittings."

The Western Railway Club and Car Foremen's Association suggest that the "ends of train pipe" be included in the air-brake parts for which delivering company is responsible.

Your Committee does not approve any of the above suggestions, but would recommend changing the rule to read as follows:

"Missing air brake hose, missing or *damaged* air brake *pipe,* fittings, angle cocks, cut-out cocks, cylinders, reservoirs, triple valves, release valves, pressure retaining valves or any parts of these items; *also pressure retaining valve and pipe when damage to car denotes rough usage (delivering company responsible).*"

RULE 34, PAGE 14.

Mr. William McIntosh suggests that steam hose and fittings be included in this rule.

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest adding "pipe, valves, fittings." These items should be included with hose and couplings at owner's risk.

Your Committee approves these suggestions.

RULE 35, PAGE 14.

Mr. F. E. Davisson suggests the elimination of the first three lines, as on that date delivering company will be responsible.

The Railway Club of Pittsburgh, Western Railway Club, and Mr. C. S. Morse, suggest omitting the words "on and after September 1, 1908" as being unnecessary when the new rules go into effect.

The Car Foremen's Association suggests changing rule to read:

"Cars equipped with air-brake hose other than M. C. B. standard, *and hose applied without swelled ends and not conforming to M. C. B. standard*," etc.

The second suggestion only is approved by your Committee.

RULE 36, PAGE 14.

The Western Railway Club suggests that inasmuch as there are a number of cars in service equipped with one-inch train line which should be changed, that this rule be modified to read as follows:

"All *freight* cars offered in interchange must be equipped with air brakes. *On and after September 1, 1909, M. C. B. standard 1¼-inch train line shall be used.*"

The above suggestion is approved.

RULE 37, PAGE 14.

The Railway Club of Pittsburgh, Mr. C. S. Morse, and Car Foremen's Association, suggest the omission of the words "on and after September 1, 1908," as unnecessary when the new rules go into effect.

W. R. McKeen, Jr., suggests omission of date.

The Western Railway Club suggests that if the recommendation made in Rule 29 is approved that reference to retaining valves in this rule be eliminated.

The suggestion regarding the omission of the date from this rule is approved.

Your Committee would suggest that the subheading under the caption of "Bodies" be changed to read:

"*Parts of* bodies which justify repairs if owners are responsible, or repairs or carding if delivering company is responsible," for the reason given under Rules 22, 25 and 29.

RULE 39, PAGE 15.

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest adding the word "*rivets*" after the word "bolts" in the last line, inasmuch as grabirons are fastened to the sides and ends of steel cars by rivets, and furthermore provision is made for applying same with rivets in the M. C. B. standards.

The Western Railway Club suggests that the rule be changed to read: "Steps, ladders, handholds or running boards in bad order or insecurely fastened, absence of grabirons or handholds, *M. C. B. couplers or their attachments,* as required by law."

Balance of rule to remain as at present.

The suggestion of the Railway Club of Pittsburgh is approved by your Committee.

RULE 40, PAGE 15.

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest the following exception to this rule: *"except destination cards not exceeding 5 by 9 inches if tacked on car."*

The Western Railway Club suggests that a paragraph be added to this rule clearly defining what should be considered an advertisement.

The Car Foremen's Association suggests adding to this rule the words: *"except destination or switching cards of size recommended by the M. C. B. Association."*

The Central Railway Club suggests adding the following: "including the removal of tin buttons or strips remaining on cars."

Your Committee does not approve either of the suggested changes, but would recommend that a new sentence be added, as follows: *"Any card or poster which bears the name of a manufacturer or shipper printed on same will be considered as an advertisement."*

RULE 42, PAGE 15.

Mr. F. E. Davisson suggests that rule be changed to read: "M. C. B. couplers not equipped with *solid* steel or wrought-iron knuckles."

Your Committee believes the suggestion is a little premature, as a good many of these open knuckles are still in service. The suggestion is not approved.

RULE 43, PAGE 15.

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest the omission of the words, "intended to be," as they convey a wrong meaning.

The Canadian Railway Club suggests making rule read: "Cars intended to be equipped with wooden beams if found with metal brake beams shall be considered proper repairs."

The Central Railway Club suggests adding new sentence as follows: "Any metal brake beam of proper dimensions and fitting properly to the car that does not require the change of hangers or other parts will be considered proper repairs."

Your Committee is of the opinion that until a standard metal brake beam is adopted no changes should be made in this rule. The suggestions are not approved.

RULE 44, PAGE 15.

Mr. F. H. Stark, Supt., Montour R. R., suggests the addition of the following:

"*Or short pocket attachments in place of long coupler pocket with friction device or spring or follower missing; or with friction device of another make substituted, or with 5 by 5 inch coupler shank or 6½-inch butt end in place of 5 by 7 inch shank or 9⅛-inch butt end, standard to the car.*"

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest a new paragraph as follows:

"*Cars equipped with M. C. B. couplers, 5 by 7 inch shank, and so stenciled, if found with couplers having a different size of shank, delivering company responsible.*"

Also that the words "tail-pin attachment" be changed to "*stem or spindle attachments,*" because a tail-pin attachment is generally known as a vertical pin in the yoke, whereas a spindle or stem attachment is meant in this rule.

Mr. C. A. Schroyer suggests adding: "*and with coupler bodies with 5 by 5 inches in place of 5 by 7 inch shanks.*"

The Western Railway Club suggests that the rule be changed to read:

"Cars equipped with M. C. B. couplers having pocket rear-end attachments, and so stenciled, if found with tail-pin attachments instead of pocket: *also cars equipped with tandem-spring attachments if found with single spring.*"

The Car Foremen's Association suggests changing rule to read:

"Cars equipped with M. C. B. couplers having pocket rear-end attachments, *or single pocket in place of tandem pocket,* and so stenciled if found with tail-pin attachments instead of pocket."

The Central Railway Club suggests adding the following: "or any car having tandem attachments found with pocket for single spring."

Your Committee approves of but one suggestion regarding this rule, viz., that of the Railway Club of Pittsburgh relative to changing the words "tail pin attachments" to "stem or spindle attachments."

RULE 45, PAGE 15.

The Western Railway Club suggests that, owing to the fact that uncoupling attachments of M. C. B. couplers must be made operative before cars can be moved at all, and to the further fact that they are covered by the suggested change in Rule 39, this rule be eliminated.

Your Committee does not believe any change is necessary in this rule.

RULE 46, PAGES 15 AND 16.

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest adding the words "*stem or*" before the word "spindle" to conform to change suggested in Rule 44.

The Western Railway Club suggests omitting reference to Rule 44 and adding to the end of rule the words, "*also uncoupling attachments of M. C. B. couplers.*"

The suggestion of the Railway Club of Pittsburgh is approved.

RULE 48, PAGE 16.

The Twin City Car Department Club and the Car Foremen's Association recommend cutting out the words "filling block."

Mr. F. E. Davisson suggests omitting the words "filling blocks," also Mr. C. A. Schroyer.

The Railway Club of Pittsburgh suggests the omission of the "combined front and back coupler stop, filling block."

Your Committee approves the suggestions regarding the omission of filling blocks from the provisions of this rule.

Your Committee would suggest that the word "defects" in the subheading above this rule be changed to "damages."

RULE 50, PAGE 16.

The Twin City Car Department Club and Car Foremen's Association recommend cutting out the words "filling block."

Mr. F. E. Davisson and Mr. C. A. Schroyer suggest cutting out the words "filling blocks."

The Railway Club of Pittsburgh suggests the elimination of this rule.

Your Committee concurs in the suggestions that "filling blocks" be omitted from the provisions of this rule.

RULE 53, PAGE 16.

The Twin City Car Department Club and Car Foremen's Association recommend cutting out the words "filling block."

Mr. F. E. Davisson and Mr. C. A. Schroyer suggest omitting the words "filling blocks."

The Railway Club of Pittsburgh suggests omitting the words "combined front and back coupler stop, filling block."

Your Committee approves the suggestions relating to the omission of filling blocks.

RULE 56, PAGE 17.

The Twin City Car Department Club recommends cutting out the last paragraph.

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest adding the following to second note under this rule:

"Neither shall damaged draft timbers and end sills be considered a combination of defects when arising from the failure of same."

Also, in third note, add the word "*not*" before "damaged," and omit "unless shown to the contrary."

Mr. C. A. Schroyer suggests cutting out the words "or knuckle," in first note under this rule.

The Western Railway Club suggests changing third note to read:

"It will be assumed that a missing coupler and attachments are *not* damaged. This refers only to cases where the coupler would enter into the combination of defects."

The Car Foremen's Association suggests adding the words "*except open knuckles,*" after the word "knuckle" in the explanatory note.

Your Committee has carefully considered these suggestions, but can approve only the suggestion of the Car Foremen's Association, and would recommend that the note read:

"The word 'coupler' in the above Rules 48 to 53 inclusive, means the coupler body or knuckle, *open knuckles excepted.*"

RULE 57, PAGE 17.

Mr. C. S. Morse suggests adding "*except as provided for in Rule 125.*"

Your Committee can not approve this proposed change.

RULE 58, PAGES 17 AND 18.

Mr. F. E. Davisson suggests making Rule 59 an exception in this rule, making it read, "except as provided for in Rules 59, 62 and 63."

Mr. C. A. Schroyer suggests cutting out the following: "but the net cost to car owner in such cases must not be greater than if the original kind and weight of material had been applied."

The suggestion of Mr. Davisson is approved, making Rule 59 an exception in this rule.

Your Committee would suggest the omission of reference to Rule 63 from this rule, as no reference is made in that rule to standards, and it has no connection with Rule 59.

Your Committee recommends that the following be added to this rule:

"Filled bearings with shells of malleable iron or cast steel must not be applied to foreign cars in repairs."

RULE 59, PAGE 18.

Mr. F. E. Davisson suggests adding the following after the first paragraph:

"In making repairs, cast-iron brake shoes may be replaced with reinforced brake shoes."

Your Committee believes this is common practice at the present time, and therefore approves the suggestion.

RULE 60, PAGE 18.

The Car Foremen's Association suggests adding after the word "practicable," "*all wheels cast after certain date should have weight cast thereon, and it shall be wrong repairs to apply wheels of less than 600 pounds to 60,000-pound capacity cars, 650 pounds to 80,000-pound capacity cars and 700 pounds to 100,000-pound capacity cars on and after that specified date.*

Your Committee does not believe any changes are necessary or desirable in this rule at this time.

RULE 61, PAGE 18.

Mr. W. R. McKeen, Jr., suggests that the gauge should show three openings for gauging flanges, as shown on Sheet M. C. B. 12.

Your Committee has already made suggestions regarding change in gauge.

RULE 62, PAGE 19.

Your Committee would suggest a new sentence as follows:

"Malleable iron couplers and open knuckles must not be used in repairs of foreign cars."

RULE 63, PAGE 19.

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest that the second paragraph of Rule 77, page 28, be combined with this rule inasmuch as it treats of the kind of repairs made, and should come under the heading of instructions to repairmen.

Mr. C. A. Schroyer suggests the above.

Mr. Jas. Coleman, M. C. B., G. T. Ry., suggests if prices for different weights of wheels are adopted (Rule 89) weights of wheels should be shown on repair cards and stubs. The Canadian Railway Club suggests that the application of M. C. B. standard axles shall be considered as proper repairs to cars found running on other than M. C. B. journals, and that owners be billed for all excess time necessitating such repairs.

Your Committee approves of the suggestion covering the transfer of the second paragraph of Rule 77 to this rule.

RULE 65, PAGES 20-22.

Mr. H. E. Passmore, M. M., T. & O. C. Ry., suggests a new clause, as follows:

"The splicing of two adjacent sills, except center sills, at the same end of the car, or the splicing of any sill between or over cross-tie timbers, will not be allowed."

The Southern & Southwestern Railway Club suggests that the splicing of two center sills on same end of car should be made more explicit, as there is now room for doubt.

Mr. F. E. Davisson suggests adding after second line, "*center sills may be spliced at both ends of car as shown in Fig. 9a.*"

The Railway Club of Pittsburgh suggests changing first sentence of second paragraph, top of page 22: "From within 30 inches of either" to "within 30 inches of *body bolster.*"

Also add to the end of second paragraph the following: "*except on cars equipped with four intermediate sills, when the intermediate sill adjacent to center sill may be spliced forward of body bolster, when either one or both center sills have been spliced.*"

Also, add to last paragraph, "*at both ends of car.*"

Mr. G. J. De Vilbiss suggests that latter part of rule be changed to read:

"Splicing of two adjacent sills, except center sills at the same end of the car, or the splicing of any sill between *or over* cross-tie timbers will not be allowed."

The Joint Car Inspectors and Car Foremen's Association suggest changing rule to read:

"Draft timbers must not be spliced: all longitudinal sills may be spliced once, *except center sills, which may be spliced at both ends of the car.*" Balance of rule to remain as at present.

Mr. G. A. Hancock suggests that first part of rule be changed to read:

"Draft timbers must not be spliced; *a* longitudinal *sill* may be spliced once, *except center sills, which may be spliced at both ends, but only between body bolster and cross-tie timber, and not within 30 inches of either.*"

The Western Railway Club suggests changing the next to the last sentence to read:

"The splicing of two adjacent sills, except center sills, at the same end of car, or the splicing of any sill between cross-tie timbers will not be allowed, *except that one inside intermediate sill may be spliced when center sills are spliced, providing that such intermediate sill splice is made between bolster and end sill.*"

Mr. C. S. Morse suggests changing the dimensions 30 inches to 24 inches; also concurs in the other suggestions of the Railway Club of Pittsburgh.

The Car Foremen's Association suggests the splicing of center sills at both ends.

The Car Foremen's Association suggests adding to the second paragraph, the following:

"*Except on cars equipped with four intermediate sills, when the intermediate sill adjacent to center sill may be spliced forward of body bolster, when either one or both center sills have been spliced.*"

Your Committee has considered the above proposed changes, and believes that some changes are necessary and that the rule should be rewritten. It would therefore suggest that the rule be changed to read:

"Draft timbers must not be spliced. All longitudinal sills may be spliced *once, with the exception of center sills, which may be spliced at both ends. Not more than two adjacent sills may be spliced at the same end of car.*

"The splice may be located either side of body bolster, but the nearest point of any splice must not be within 12 inches of same, excepting center sills, which must be spliced between body bolster and cross tie timbers, and not within *24* inches of either.

"Longitudinal sills other than center sills where less than 12 inches in depth, the plan shown in Fig. 8 is to be followed. When the sills are 12 inches or more in depth the plan shown in Fig. 9 is to be followed. When center sills are spliced the plan shown in Fig. 9a is to be followed.

"Steel sills may be spliced *in the most convenient location in accordance with* Figs. A, B and C. *Adjacent steel sills may be spliced.*"

RULE 72, PAGE 24.

Mr. D. F. Crawford, G. S. M. P., Penna. Lines, suggests that, owing to discrepancies in the light weight of various cars, the subject should be given attention, particularly the period which should elapse between reweighing and proper arrangement for reweighing foreign cars.

The Association of Transportation and Car Accounting Officers submitted the following resolution:

"*1. New cars should be correctly weighed and stenciled at the car works, under the supervision of the owner's inspector. The scales used for this purpose should be tested by the railroad company's inspector; provision to this effect to be incorporated in the contract covering purchase of the equipment.*

"*2. All wooden cars one year old should be reweighed and restenciled, the weight to be followed by one star; cars two years old should be again weighed and stenciled, the weight to be followed by two stars; cars three or more years old should be again weighed and stenciled, the weight to be followed by three stars, which will indicate final weight.*

"*3. All steel cars should be reweighed and restenciled after they have been in service twelve months, the weight to be followed by three stars, indicating final weight.*

"*4. If cars, on which the stenciled weight is followed by three stars, are materially changed by reason of new appliances or otherwise, they should be reweighed and restenciled, the weight to be followed by three stars.*

"*5. Any car without stenciling, or where a variation of five hundred pounds is found, should be immediately reweighed and restenciled under M. C. B. rules; new weights of foreign cars should be reported to car owners as provided therein.*"

Your Committee believes this is a matter that should be considered by the Executive Committee before incorporation in the rules of interchange, and therefore takes no action other than to refer it to that Committee.

RULE 73, PAGE 25.

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest adding to end of this rule: "*except where repairs are made on defect card, when the expense of relightweighing and stenciling should be included in the bill.*"

Your Committee does not approve this suggestion.

RULE 75, PAGE 25.

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest changing this rule to read:

"When two or more cars *carrying twin and triple shipments of long*

lading, chained together ***with switch chains and couplers blocked out with metal spacing blocks*** are delivered at an interchange point, the receiving road shall deliver to the delivering road at the time, an equivalent number of switch chains ***and metal spacing blocks (including plates, bolts and nuts)*** of the same size as the chains and blocks used on the cars delivered, or in lieu thereof furnish a defect card for such chains ***and metal spacing blocks.***"

Mr. L. L. Tyler, Tacoma Eastern R. R., suggests that same provision be made for coupler blocks and U bolts in cases of double and triple loads.

The Western Railway Club suggests that, owing to the fact that a great many roads are not using chains, it is recommended that this rule be eliminated.

Your Committee believes the rule should remain as at present and therefore does not approve these proposed changes.

RULE 76, PAGES 25 AND 26.

Mr. J. W. Marden, S. C. D., Boston & Maine R. R., suggests the abolishment of the repair card for the reason that it does not accomplish the purpose for which it was designed.

Mr. R. N. Dodge, F. C. D., Ill., Iowa & Minn. Ry., suggests that inasmuch as it has become the practice to abbreviate information on repair cards to such an extent that no information is shown of the work done, that a rule be introduced making it necessary to show dimensions of parts applied, such as draft timbers, end sill, coupler pockets, bolts, etc.

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest adding at the end of second sentence of first paragraph: "*State whether the car is empty or loaded,*" to enable the bill clerk to properly prepare the bill.

The Western Railway Club renews the suggestion made last year, adding the words, "*and state if car is loaded or empty,*" and also eliminate all reference to the brake staff, making the first paragraph read:

"When repairs of any kind are made to foreign cars a repair card shall be securely attached to the outside face of intermediate sill between cross-tie timbers on wooden cars and on steel cars to cardboard located either on cross-tie under car or on inside of sidesill at the end of car. The card shall specify fully the repairs made and reason for same, the date and place where made, and name of road making the repairs; also show location of parts repaired or renewed, *and state if car is loaded or empty.* The end of car ....toward which the cylinder push rod travels shall be known as the 'B' end, and the opposite the 'A' end." Balance of rule to remain as at present.

The Car Foremen's Association suggests eliminating reference to brake shaft.

None of the above suggestions meet with the approval of your Committee.

Mr. J. W. Marden, Superintendent Car Department, Boston & Maine Railroad, Boston, Mass., submitted the attached suggestion to the New England Railroad Club, and it was voted: "that as this is such a radical departure from the present and past custom, Mr. Marden's proposed changes in Rules of Interchange be referred to the Arbitration Committee of the Master Car Builders' Association, stating that while we, the New England Railroad Club, are not yet in a position to recommend its passage at the hands of the Master Car Builders' Association this year, we fully believe the subject should receive the careful consideration of the Arbitration Committee, the latter to report its findings or recommendations to the Master Car Builders' Association." The suggestion is as follows:

"That the M. C. B. Association Repair Card as provided in Rules 76, 77, 78, 79, be abolished and that

"Bills for expense of repairs to foreign freight cars be rendered by all Railroad Companies on the basis of an average cost price per freight-car mile, without details of either labor or materials.

"The following reasons are assigned for the above suggestion:

"The operation of the rules as a whole calls for a large expenditure of labor both on the part of the inspector and from a clerical standpoint; in other words, the rules are now so cumbersome, all points with reference to car repairs having been covered in such minute detail, that it is no doubt true that very few of our inspectors and repairmen have anything like a full understanding of their requirements.

"This being the case, would it not be desirable in many cases, particularly in view of the fact that the expense of handling equipment has now reached a degree of uniformity on all railroads, that a much simpler Code of Rules might be put into effect with good results to all concerned. It would be my idea that the situation might be handled in some such way as railroads are now handling the questions of mileage and per diem, both of which represent car rental and which are priced per mile and per day at an estimated figure.

"Why not, therefore, take the expense of repairs to foreign cars and consider the same at a price per mile, basing such a price on the average cost of repairs per mile to all roads in interest for a considerable period, say twelve months or even longer? By this means we could arrive at a basic price per mile for repairs to our foreign cars, and each road whose cars were represented on this line during a given month would be consequently billed at this basic price per mile. The bill so rendered would be of the simplest form requiring a minimum of effort.

"Information as to the exact method of repairs, etc., which now requires such a mass of correspondence in many cases, would be all avoided and the general result would be practically the same.

"It would seem to me that the adoption of a plan of this character would work no hardship to railroads, but on the contrary would be a positive saving of many thousands of dollars each year. This plan would be in harmony, as I previously stated, with the car rental plans, and for practical purposes should give better results than we are receiving to-day, if care is taken in arriving at the most equitable basic price per mile for the expense of repairs.

"As a matter of record, this road made repairs to foreign cars for twelve months ended October, 1907, at an average of 27,012 cars per month, and as provided by the Rules now in force, all of such repairs but a very small percentage (classed as delivering company's defects) were billed against the car owners.

"With regard to rules of interchange, we would still necessarily have a Code of Rules governing the interchange of equipment of cars at junction points. We would be obliged to use the defect card voucher so that a road receiving a car might be protected on account of defects then in evidence.

"The rules relating to standards, wheels and axles, safety appliances, couplers, prices for materials used, improper repairs, home route cards, prices for cars destroyed and settlements with reference to same as well as some other requirements would necessarily continue in effect, but the M. C. B. repair card now used so extensively would no longer be needed either for attachment to the car or to the bill; but Rule No. 1 of the Code would, in my opinion, be of sufficient scope to fully protect the car owner as it broadly requires that 'Each railway shall give to foreign cars, while on its line, the same care as to oiling, packing, and inspection, that it gives to its own cars.'"

Your Committee is of the opinion that the above is too radical a change in the rules to be passed upon at this time, but is made a part of this report for the information of the members, and that it may be acted upon at some future period, if thought desirable.

RULE 77, PAGES 26-27.

The Twin City Car Department Club suggests adding the following: *"In case of lug bolts applied they should state whether applied to front or rear lug. In case of oil boxes, oil-box bolts or journal bearings applied, repair card should show number of the journal to which same is applied."* (The Committee should state a method of designating journals.)

Mr. Donald Allison, M. C. B., clerk O. R. R. & Nav. Co., suggests a new form of repair card stub.

Mr. F. E. Davisson suggests that the use of a standard carbonized repair card be authorized of the same form as now standard.

Mr. C. A. Schroyer suggests that that part of the rule on page 28 be eliminated and added to Rule 63.

Mr. G. A. Hancock suggests that the second sentence (page 26) be changed to read:

"This card shall specify fully the repairs made, and reasons for same, *giving description, dimensions and numbers of the different kinds of material used,* etc." Balance of rule to remain as at present.

Your Committee approves the suggestion of Mr. Schroyer that the second paragraph of this rule, beginning at top of page 28, be transferred to Rule 63, in order that the instructions regarding detailed information covered by repair card be included in one rule.

Regarding the suggestions that have been made in reference to changes in the repair card, your Committee feels that changes can be made and information given on the card that will save a great deal of time when making up bills. It is suggested that this be made a subject for Committee work.

RULE 80, PAGE 28.

Mr. G. S. McKee suggests that roads should not require separate bills for certain series in their car numbers.

Your Committee does not concur in this suggestion, believing it is an accounting question rather than a car repair question.

RULE 85, PAGE 29.

Mr. R. A. Billingham, S. M. P., P. S. & N. R. R., suggests that cars having wrong repairs may be rejected by receiving company until defect card is applied by delivering company at interchange point.

Mr. Wm. McIntosh suggests that when joint evidence is taken and the wrong repairs not corrected at the time, that a duplicate evidence card be attached to the intermediate sill of the car. This would avoid the taking of joint evidence at some other junction point.

The Western Railway Club and Car Foremen's Association suggest that all reference to the brake staff be omitted from this rule.

None of the above suggestions are approved by your Committee.

RULE 87, PAGE 32.

The Twin City Car Department Club suggests changing rule to make car owners responsible for bottom rods and brake levers missing, except when lost with brake beam.

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest inserting "*brake pins*" after "key bolts," in the fourth line, and add "*lever guides*" following "brake levers," in the fifth line.

The suggestion of the Railway Club of Pittsburgh is approved.

RULE 89, PAGE 35.

The Railway Club of Pittsburgh suggests omitting the secondhand and scrap prices for 33-inch and 36-inch cast-iron wheels, and substitute therefor a uniform credit price of $5.50 and $6, respectively, for 33-inch and 36-inch cast-iron wheels.

Also, change second paragraph of this rule to read:

"Removing, turning and replacing a pair of steel or steel-tired wheels: $3.50 for pedestal type of truck and $3 for arch bar truck."

Mr. T. H. Curtis suggests a price per pound for cast-iron wheels inasmuch as we have three different weights of wheels.

The Western Railway Club suggests that inasmuch as the M. C. B. Association has three different weights of wheels that the prices given in this rule for 33-inch cast-iron wheels should show prices for wheels of different weights.

The Car Foremen's Association suggests, if recommendation in Rule 60 is adopted, that special prices should be adopted for 600, 650 and 700 pound wheels.

Jas. Coleman, M. C. B., G. T. Ry., suggests increasing price of 33-inch wheels to cover all weights, or prescribe prices for different weights of this size.

The suggestion of the Railway Club of Pittsburgh changing the second paragraph of this rule reducing the charge for removing, turning and replacing steel or steel-tired wheels, is approved, but would recommend that the price for pedestal type of truck be modified, making the rule read:

"Removing, turning and replacing a pair of steel or steel-tired wheels, *$3.25* for pedestal type truck and *$3.00* for arch bar truck."

RULE 91, PAGE 36.

W. R. McKeen, Jr., suggests the following paragraph:

"*M. C. B. couplers or knuckles must show the name of coupler, also date cast, on coupler or knuckle.*"

The Committee can not approve this suggestion, believing it will not accomplish the purpose for which it is intended.

Rule 92, Page 36.

Mr. R. A. Billingham, S. M. P., P. S. & N. R. R., suggests that when repairs are made to foreign cars that the correct sizes of materials for followers, draft springs and brasses be given, such as brasses 4¼ by 8 inches instead of 8 inches, on account of the difficulty in billing when proper sizes are not given.

The Western Railway Club and Car Foremen's Association suggest that last sentence be changed to read:

"If no marks are found *cast* on wheels or *stamped* on axles removed, a notation to that effect must be made on face of bill."

Neither of the above suggestions is approved by your Committee.

Rule 94, Pages 36-39.

Mr. W. L. Kellogg, M. M., Pere Marquette R. R., suggests that a credit be introduced in the rules for Harvey friction draft springs in case of car destroyed on a foreign line.

The Twin City Car Department Club suggests adding new item reading:

"Carriage or furniture cars having full size double end doors, $3 each."

Also add footnote.

"Couplers for which no solid knuckles are manufactured account of obsolete, when removed account of broken or missing knuckle, coupler body to be credited as scrap."

Or else make application of open knuckles to such couplers proper repairs.

The Southern & Southwestern Railway Club suggests that the price for gray-iron castings be increased: that the price of 3½ cents per foot for poplar is too low; it costs 7 cents per foot.

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest the following changes in prices:

	8-inch	10-inch
Angle cock, plain handle	$1.50	$1.50
Angle cock, self-locking handle	1.80	1.80
Pressure-retaining valve, two-position	1.00	1.00
Pressure-retaining valve, three-position	2.25	2.25
Coupler body, one, malleable, 5 by 5 inch shank, credit for scrap		*$0.90*
Coupler body, one, malleable, 5 by 7 inch shank, credit for scrap		*1.00*

Add to price-list:

Coupler lock, one, new, charge, 40 cents; credit, 6 cents.

Add after "journal bearings, filled brass or bronze shell," and above the explanation of the arbitrary weights, as follows:

Journal bearings, cast steel or malleable back, scrap, credit 4 cents per pound.

Add:

Pipe, one inch, per foot, 5 cents.

Mr. W. R. McKeen, Jr., suggests adding:

Door for side of 100,000-pound capacity box, carriage, automobile or furniture car, wooden, each, applied, no credit for scrap........$5.00

Also increase charge for brake shoes as follows:

Brake shoes, applied, no credit for scrap	*35 cents.*
Brake shoes, reinforced back, applied, no credit for scrap	*45 cents.*

Add:

Lining, side and end, replaced, per square foot	*1 cent.*
Decking, replaced, per lineal foot	*12 cents.*
Roofing, 4 foot or under, replaced, per lineal foot	*5 cents.*
Roofing, 5 foot or over, replaced, per lineal foot	*4 cents.*

Mr. W. B. Hall, Mather Stock Car Co., suggests that inasmuch as there has been a perceptible decrease in the cost of car materials, especially lumber, that the prices of materials be made to more nearly harmonize with the present prices, and suggests the following prices for lumber:

Oak	*$30.00*
Sills	*25.00*
Roofing	*20.00*
Decking	*20.00*
Siding	*35.00*

Mr. H. J. Small suggests adding:

Door, metal, for end of box car, applied........................85 cents.

Jas. Coleman, M. C. B., G. T. Ry., suggests a fixed price and credit for other individual parts of couplers instead of rate per pound.

The Western Railway Club suggests that the prices in this rule be revised to more nearly conform with present market prices.

Mr. E. D. Bronner suggests the addition of the following:

"Cotter pins, for key-bolts and brake-pins, on brake rigging, 2 cents."

Your Committee, after considering these proposed changes, would recommend the following:

Air brake equipment:	8 in.	10 in.
Angle cock, plain handle	$1.50	$1.50
Angle cock, self locking handle	1.80	1.80
Pressure retaining valve, two position	1.00	1.00
Pressure retaining valve, three position	2.25	2.25
Spring cotter pins for key-bolts and brake-pins, each	.02	.02

	Charge.	Credit.
Coupler body, one, malleable, 5 by 5 inch shank, credit for scrap		.90
Coupler body, one, malleable, 5 by 7 inch shank, credit for scrap		1.00
Coupler lock, one, new	.40	.06
Half door, for end of furniture or carriage car, each, applied, no credit for scrap	3.00	
Journal bearings, cast steel or malleable iron back, credit for scrap, per pound		.04
Labor, per hour	.24	
Pipe, one inch, per foot	.05	

RULE 98, PAGE 40.

The Twin City Car Department Club suggests cutting out second paragraph relative to not returning bills account of wrong car number, etc., as this is a matter entirely outside the jurisdiction of the M. C. B. Association.

The Southern & Southwestern Railway Club suggests that this rule be modified, as it is not being lived up to.

Mr. J. E. Gould advises that this rule be modified to conform with the ruling of the statistician of the Interstate Commerce Commission.

Mr. F. E. Davisson suggests that this rule be revised, as a number of roads are not complying with it.

At the convention of 1907 it was suggested that this rule conflicted with the rules of the Accounting Officers' Association, and your Committee was instructed to confer with that Association to see whether the rule should be modified or entirely eliminated. The following letter from the president of the American Association of Railway Accounting Officers to Mr. Demarest indicates how far your Committee has succeeded in arranging the conference:

CHICAGO, ILL., March 30, 1908.

Mr. T. W. Demarest, Supt. Motive Power, Penna. Lines W. of Pitts., Ft. Wayne, Ind.:

DEAR SIR,— With further reference to the matter of M. C. B. Rule 98, and your letter to me, dated August 14, 1907.

In your letter I find the following questions:

1. Was the rule as originally outlined in the Proceedings of 1897 introduced at the request of the Railway Accountants' Association?

My answer to that question is "Yes."

2. Does the rule as written in 1897, or in its present form, violate any principles of your Association?

My answer is "No." We now settle interline freight reports, interline ticket reports and interline per diem reports as rendered; this is in accordance with the rules of our Association. Of course, such reports contain numerous errors, which are adjusted through corrections effective in subsequent months. This is done regardless of the amounts involved.

Your third question is, what, in my opinion, should be the attitude of an auditor toward the rule as written.

From your letter, and from conversation with your Mr. Wilt, I understand that only a very few auditors object to the enforcement of M. C. B. Rule No. 98. Therefore, I should prefer not to express a personal opinion on that subject. However, I might say that last fall I wrote to some twenty or twenty-five chief accounting officers of various railroads in the central west, northwest and southwest as to their attitude regarding this rule, and they were very largely in favor of enforcing it. Only one or two offered any objections thereto. I do not anticipate that we will encounter any difficulty with the Interstate Commerce Commission by passing car repair bills as rendered and adjusting discrepancies afterward. If we do, we will certainly encounter difficulties in the settlement of our interline freight, ticket and per diem accounts. Personally I should like to see the principle of making settlement on the basis of the account as rendered with discrepancies adjusted later extended rather than restricted. The advantage of making such settlement is that the bulk of the account, say 95 per cent or more, is always correct, and should be paid, and that the entire account should not be held up for a discrepancy of from 5 per cent down to a very small fraction of a per cent of the total account. By paying the account in full, and settling the discrepancies afterward, the money reaches the proper treasury much sooner than when the account is delayed for the settlement of small discrepancies.

Your final question is, what is the opinion of our Association as to the advisability of permitting the rule, as written at present, to remain in the M. C. B. Code of Rules, or if any changes should be made in same, or if the rule should be removed entirely.

You understand I can not speak for the Association, but I will undertake to have this matter brought before the Association, and have it properly ruled upon. It is now too late to have the matter acted upon by a proper committee and reported at our next meeting. Personally, I am opposed to taking action on important matters without their passing through a proper committee, and coming to the Association through the report of the Committee. Hence this may be delayed a year, but as a very large majority of the roads are working under M. C. B. Rule 98 now, the delay will not be harmful.

Kindly advise if this fully answers your questions, or if there is any further information that I can give you on this subject.

Yours truly,

(Signed) FRANK NAY,
President.

Mr. Jas. Coleman suggests inserting the words "car repairs" after "bills shall be rendered for" and eliminate both time limits of sixty days. Change second paragraph last sentence to read "or letter of authority to cover amount of overcharge, said letter to be attached to bill."

Your Committee is of the opinion that the rule in its present form is correct, and should not be modified or eliminated.

RULE 99, PAGE 41.

Mr. H. J. Small suggests changing rule to read:

"*Separate monthly bills shall be rendered as follows:*

"*1. All repairs of freight cars based on repair stubs.*

"*2. All repairs of freight cars based on defect cards.*"

Mr. Jas. Coleman suggests changing rule to read: "All companies should render monthly bills divided as follows:

"1. Repairs of owners' defects.
"2. Repairs made on authority of defect cards.
"3. Value of cars destroyed.
"4. Materials furnished for repairs.
"5. Overcharges in bills passed for payment."

RULE 100, PAGE 41.

The Western Railway Club suggests a new paragraph as follows:

"Malleable backed filled journal bearings shall not be used in repairing foreign cars."

The Car Foremen's Association suggests a new paragraph, reading:

"Cars shall be considered as wrongly repaired if found with other than M. C. B. brass or shell journal bearings."

The Canadian Railway Club suggests that all journal bearings which are filled or have malleable backs be condemned and no allowance made for scrap.

The above suggestions have been covered by the recommendations of your Committee in Rule 62.

RULE 101, PAGE 41.

Mr. F. E. Davisson suggests changing the second paragraph of this rule to read:

"No credit for scrap, and no charge for labor shall be allowed in renewing brake shoes *except charges made on authority of defect card.*"

Your Committee thinks this change in the rule unnecessary.

RULE 102, PAGE 41.

Mr. William McIntosh suggests that the question of whether metal brake beams of different makes are interchangeable when hangers and connections are not changed should be made clearer in the rules.

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest changing rule to read:

"When M. C. B. couplers are replaced, good *M. C. B. standard* secondhand material may be used: when metal brake beams are replaced, good secondhand material may be used, but they must be charged at 75 per cent of the price when new. The credits for similar parts released from service, in good condition, must also be 75 per cent of the price when new," to insure coupler parts used in repairs meeting M. C. B. specifications and tests.

Your Committee does not approve the above suggestions.

Rule 103, Page 41.

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest adding to end of this rule, "*except when repairs are made on authority of M. C. B. defect card, when freight charges may be billed in addition to the market price of the manufactured article.*"

Your Committee believes this change is unnecessary.

Rule 105, Pages 41, 42.

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest increasing the price for altering height of one end of car, net, from $1.10 to $1.25.

Mr. G. A. Hancock suggests the following:

Putting on one handhold or grabiron, *on wooden car, net*	*25 cents.*
Applying grabiron or handhold to steel car, where secured by rivets	*40 cents.*

The suggestion of the Railway Club of Pittsburgh is approved.

Rule 106, Pages 42-48.

Mr. R. N. Dodge, F. C. D., Ill., Iowa & Minn. Ry., suggests that rule be amended so that carrier iron bolts be considered as same and charged as per Rule 106, but when applied at the same time and end of car with draft bolts that they be included with draft bolts.

Mr. R. N. Dodge suggests that a separate item be made of American continuous draft rods, allowing 3 hours for removing, repairing and replacing each rod.

Mr. J. L. Hodgson, M. C. B., Grand Trunk Ry., suggests a charge for applying Butler casting bolts, in part or all, in the same manner as draft timber bolts on an empty car.

Mr. William McIntosh suggests that the last item in this rule on page 47 include American continuous draft rods; also that item 11, page 43, "center pin head applied loaded car, 2 hours," be omitted on page 43 and included in last item on page 47, and item 13 entirely omitted, the labor in last item on page 47 to be sufficient for placing car on center when loaded.

Mr. J. P. Young, G. F. C. D., Mo. Pac. Ry., advises that there is a great diversity of opinion as to the charge for carrier iron bolts and draft timber bolts, which should be made clearer by the Committee.

The Twin City Car Department Club suggests the following:

Add new item:

Carrier iron bolts, 4 inches long or less, that run through steel buffer casting	*¼ hour each*

Change:

Center pin head, applied, loaded car	3½	hours
One or two column bolts, same truck	2	hours
Three or more column bolts, same truck	3	hours

The Southern & Southwestern Railway Club suggests that a special labor charge be made for Butler casement bolts; also, that charge for hanging end door, applying release rod, be reduced to 12 cents.

It also suggests that stripping train pipe by fair usage should be billable and so stated.

Mr. Donald Allison, M. C. B., clerk, O. R. R. & Nav. Co., suggests that the charge for replacing long draft timbers be increased.

Mr. F. E. Davisson suggests the following:

Under the head of "brake beam, one, metal, blacksmith labor repairing," omit the word "blacksmith," as beams are often repaired by others than blacksmiths.

Increase item of "column bolt, one or more, replaced in same truck 2 hours" to 3 hours.

Under the heading of sills, add, "2 center sills spliced, ordinary car, 20 hours; refrigerator car, 24 hours," to conform to supplement of Arbitration Committee.

Eliminate the item "an additional charge of 75 cents shall be allowed in replacing intermediate or center sills on cars equipped with air brakes," and add 3 hours to the labor charge for applying sills, as all cars in interchange are equipped with air brakes.

The Railway Club of Pittsburgh suggests the following:

Change third item to read: "American continuous draft rod, *each weld,* one hour."

Eliminate reference to carrier iron bolts from supplement and combine carrier iron bolts and draft timber bolts, and change to read as follows:

Draft timber bolts, *or carrier iron bolts, either or both,* three or less, at one end of car, replacing	2 hours 50 cents.
Draft timber bolts, *or carrier iron bolts, either or both,* four or more, at one end of car, replacing	3 hours 75 cents.

Eliminate reference in supplement to "the bolts passing through the rear end of draft timber and upper center plate," etc., and allow the center plate bolts to remain as at present and be considered a separate proposition from draft timber bolts.

Change "center pin key applied" to "center pin key or center pin without head applied."

Add to the items, "coupler with stem attachments," and "coupler with pocket attachments" after the words "coupler stops," the words, "one or more coupler stop bolts, when necessary to remove coupler."

Change the price for one-half hour labor wherever it appears in the labor column from 15 to 12½ cents.

Change "center pin head, applied, loaded car," from 2 to 3 hours; "center pin head, applied, loaded car, and putting same on center," from 4 to 5 hours.

Change coupler with pocket attachment to read:

Couple with *single spring* pocket attachments, coupler spring, one or more follower plates, one or more coupler stops, coupler pocket, coupler pocket rivets, renewing or replacing any or all, at same end of car at same time	4 hours	$1.00
Coupler with *tandem, twin or friction pocket attachments,* coupler springs, one or more follower plates, one or more coupler stops, coupler pocket, coupler pocket rivets, renewing or replacing any or all, at same end of car at same time	5 hours	1.25

Add the following:

Draft timbers extending beyond body bolsters, one, replaced	*9 hours.*
Draft timbers extending beyond body bolster, one, replaced, when its center sill has been replaced	*3 hours.*
Draft timbers extending beyond body bolster, two on same end, replaced	*13 hours.*
Roofing, per lineal foot	*10 cents.*
Flooring, per lineal foot	*15 cents.*

Add the words, "per lineal foot" after the word "siding" for refrigerator cars.

Referring to supplement, change "2 center sills, wood, spliced same end of car" to *22* and *26* hours respectively.

Eliminate the item, "an additional charge of 75 cents shall be allowed in replacing intermediate or center sills on cars equipped with air brakes," and add 3 hours to all prices for replacing center and intermediate sills.

Mr. G. S. McKee suggests that there should be a difference in the labor charge for applying couplers of single spring pocket attachments and the double spring or tandem attachments, as the latter requires more time than the former.

Also, that there should be a difference in the labor charge for applying a deadwood and deadwood bolts. The time required to remove and replace a deadwood is more than required to remove 4 deadwood bolts.

Also, labor charge for draft timbers and deadwood renewed; draft timbers and carrier iron bolts when one or more bolts are renewed; draft timber bolts and carrier iron bolts when such bolts only are removed; coupler and deadwood; coupler and carrier iron bolts when requiring renewing. Sub-sill labor should be embodied.

Mr. C. A. Schroyer suggests 2 hours' labor charge for welding American continuous draft rod; center pin head, applied, loaded car, 3 hours.

Mr. C. A. Schroyer recommends a labor charge for replacing 6 or less coupler stop bolts, lug strap bolts or draft timber tie bolts, ½ hour each in cars equipped with coupler with stem attachments, and for replacing 8 or less coupler stop bolts, lug strap bolts or draft timber tie bolts, ½ hour each, in cars equipped with couplers with pocket attachments.

> Coupler with pocket attachments *having 5 by 7 inch coupler shank,* coupler spring, one or more follower plates, one or more coupler stops, coupler pocket, coupler pocket rivets, renewing or replacing, any or all, at same end of car at same time....*5* hours.
>
> Coupler *with 5 by 5 inch shank* with pocket attachments, coupler spring, one or more follower plates, one or more coupler stops, coupler pocket rivets, renewing or replacing, any or all, at same end of car at same time..............................4 hours.

Mr. L. B. Ferguson asks that charge be made for labor of splicing two center sills.

Mr. G. J. De Vilbiss suggests a labor charge for two draft timbers and one center sill applied at same end of car.

Mr. F. H. Sheffer suggests changing certain items in this rule to read:

> *Truck spring, one or all, on same side of truck...............2 hours.*
>
> *Column bolts, one or more, replaced, on same side of truck.....2 hours.*
>
> *Center pin, head, applied, loaded car........................3½ hours.*

Mr. G. A. Hancock suggests the following:

> *Draft timber, replaced, when center sill on same end, but on opposite side, is replaced or spliced........................3 hours.*

Under the head of labor replacing draft timber bolts make note.

> *"No extra labor allowed for applying draft timber bolts to one timber when its opposite timber is renewed at the same end of car and the same time."*

After deadwood block insert item:

> *Deadwood block, wooden, replaced at one end of the car when one or more draft timbers are replaced..................2 hours.*
>
> *Deadwood block, wooden, replacing at one end of car when coupler is dropped for any reason......................2 hours.*

Add as a last clause:

"In order that charge for removing loads may be allowed, card must state that car was loaded when sent out with bill, and statement to that effect after a charge has been questioned will not be authority for making the extra charge."

Mr. H. Halvorson, M. C. B., Wis. Central, suggests that a price be named for applying two draft timbers and one center sill.

The Western Railway Club suggests the following changes:

1. American continuous draft rods, one rod, welding, 1 hour, be increased to *2* hours, as it is almost invariably necessary to straighten the rod.

2. *Draft timber, long, one, replaced, 9 hours.*

3. *Draft timber, long, one, replaced, when its center sill has been replaced 3 hours.*

4. *Draft timber, long, two, on same end replaced, 13 hours.*

5. *Butler draft attachment bolts, 2 or less, 2 hours; Butler draft attachment bolts, 3 or more, 3 hours.*

6. That the title on page 48 be changed to read: "Repairs of steel *or steel parts of composite cars.*"

Mr. R. F. McKenna suggests a price for the application of Butler cross bolts.

The Car Foremen's Association concurs in the suggestion of the Western Railway Club regarding change of title on page 48.

Also suggests the following charges:

One truck bolster and one truck side, same truck	*15 hours.*
One side brace and one side post	*5 hours.*

The Canadian Railway Club suggests that a charge for applying Butler casting bolts, in part or all, be included in this rule; also that the time allowance for applying center pin head, loaded car, be 3½ hours — that is, 3 hours for removing load and ½ hour for applying pin.

Mr. W. R. McKeen, Jr., suggests the following:

Body truss rod in one piece, removed, repaired and replaced, each	3 hours.
Body truss rod with turnbuckle, removed, repaired and replaced, per section	2 hours.
1 end sill, under siding, and two new draft timbers, applied, at same end of car	22 hours.
1 center sill and two new draft timbers applied, at same end of car	37 hours.

Your Committee has very carefully considered the above suggestions, and recommends that the following changes and additions be made in the rule:

Change:

American continuous draft rods, one rod, welding	2 hours.
Brake shoe, applied on authority of defect card when brake beam is not replaced	½ hour.

Add:

Carrier iron bolts, 4 inches long or less, each	¼ hour.

Substitute:

Center plate bolts, when same do not pass through draft timber, one or more or all at same end	3 hours.

Add:

Coupler stop bolts, lug strap bolts or draft timber cross-tie bolts, 5 or less, at same end of car, when coupler is not replaced, each	½ hour.
Coupler stop bolts, lug strap bolts or draft timber cross tie bolts, 6 or more at same end of car, when coupler is not replaced	3 hours.

Change:

Center pin head, applied, loaded car	3 hours.
Center pin head, applied, loaded car, and putting same on center	5 hours.

Substitute:

Draft timber, one, renewed, when its center sill is renewed or spliced at same end of car	*2 hours.*
Draft timber, one, renewed, when its opposite center sill at same end of car is renewed or spliced	3 hours.

Combine:

Draft timber bolts, *or carrier iron bolts, either or both,* three or less, at one end of car, replacing	2 hours.
Draft timber bolts, *or carrier iron bolts, either or both,* four or more, at one end of car, replacing	3 hours.

Substitute:

Draft timber bolts when same do not pass through upper center plate, three or less	*2 hours.*
Draft timber bolts when same do not pass through upper center plate, four or more	*3 hours.*
Draft timber bolts when one or more of the bolts pass through the center plate, add	*3 hours.*

(No additional charge to be made in this case if one or more or all of the center plate bolts at same end of car are renewed.)

Add:

Draft timber, one, renewed, when upper center plate bolts pass through rear end of draft timber	*10 hours.*

Add:

2 center sills, spliced, ordinary car	*22* hours.
2 center sills, spliced, refrigerator car	*26* hours.

Add following, Item 7, page 46:

One end sill under siding, renewed, when one or more defective sills have been spliced	*10 hours.*

Add following, Item 8, page 46:

One end sill outside siding, renewed, when one or more defective sills have been spliced	*3 hours.*

Change Item 15, page 47, to read:

Each side or intermediate sill spliced, when longitudinal sills have to be replaced, *or when other sills are spliced at same end*	*3 hours.*

Add:

Roof boards, single, including removing and replacing running board, per lineal foot	7 cents.
Roof boards, double board roof, including removing and replacing running board, per lineal foot	9 cents.

Eliminate the item on page 47 reading "an additional charge of 75 cents shall be allowed in replacing intermediate or center sills on cars equipped with air brakes" and increase the number of hours allowed for replacing intermediate and center sills by 3 hours."

Change the heading top of page 48 to Repairs of Steel *or Steel Parts of Composite* Cars.

Change the price of labor under repairs of steel cars to 24 cents per hour.

RULE 107, PAGE 48.

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest adding "*no charge to be made for adjusting brakes.*"

Your Committee approves this suggestion.

RULE 109, PAGE 48.

Mr. F. E. Davisson suggests eliminating Rules 109, 110 and 111, and substituting the following:

"*No additional labor charge shall be made in making repairs to two or more items for which the rules have specified a labor charge for each, where the labor charge on the one item will cover two or more.*"

Your Committee can not approve of this suggestion.

RULE 111, PAGE 48.

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest adding:

"*When pocket coupler and one or more carrier iron bolts are replaced at same end of car the regular labor charge shall be reduced one hour.*"

Your Committee approves this proposed addition, but would suggest that it read as follows:

"*When one or more carrier iron bolts are replaced, where coupler at same end of car is removed and replaced for any other reason, the regular labor charge should be reduced one hour.*"

RULE 112, PAGES 48-55.

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest adding:

Emergency check valve, grinding in	*10 cents.*

Change:

Angle cock handle, removed and replaced, from	7 to *4* cents.
Cut-out cock handle, removed and replaced, from	3 to *4* cents.

The Car Foremen's Association suggests that first sentence be changed to read:

"The following table shows the labor charges allowable for air brake *repair* work," etc.

Your Committee approves of all the changes suggested in this rule.

Rule 113, Pages 55-59.

Mr. G. S. McKee suggests that the rules have a depreciation table embodied in it.

Jas. Coleman suggests that prices for wooden cars should be considerably increased.

Your Committee does not approve either suggestion. It believes, however, the prices for trucks should be revised, and offers the following:

Trucks.

50,000 pounds capacity with metal transoms and wooden bolster, per pair	$215.00
60,000 pounds capacity or under, with wooden bolster, per pair	215.00
60,000 pounds capacity, *but under 80,000 pounds,* all metal	315.00
80,000 pounds capacity, *but under 100,000 pounds,* all metal, per pair	400.00
100,000 pounds capacity, *or over,* all metal, per pair	425.00

Several inquiries have been received as to what constitutes a special stock car. Your Committee believes that the following revision of the rule will make it plainer:

"The bodies of refrigerator cars, stock cars *permanently fitted for stall shipments,* tank cars," etc. (balance of rule on page 59 to remain as at present). On page 60 the rule should be changed to read:

"In the case of cars equipped with racks for carrying coke and for other such purposes, and also stock cars *other than those permanently fitted for stall shipments,* with feeding and watering attachments, the actual cost of these equipments shall be added to the standard settlement prices for such cars."

Rule 117, Pages 60-61.

The Western Railway Club suggests that the item of "*worn-out parts of brakes as prescribed by Rule 29*" be added to the sixteenth line following the figures 22 and 23.

Your Committee approves of this suggestion.

Rule 122, Page 62.

The Southern & Southwestern Railway Club suggests that roads destroying cars should be required to send a signed prepaid bill of lading to owners of trucks covering shipment of same.

The Railway Club of Pittsburgh and Mr. C. S. Morse suggest an exception to this rule, as follows:

"Except in cases of trucks of 50,000 pounds capacity or less, in which case the railroad company destroying the car may elect to retain the trucks and settle for same at scrap value (with the exception of wheels and axles, the value of which must be settled for in accordance with the schedules provided in M. C. B. Rules of Interchange.")

Your Committee can not give its approval to either of these suggestions.

RULE 125, PAGES 62 AND 63.

The Southern & Southwestern Railway Club suggests that the decision in Arbitration Case 720 be included in this rule.

Your Committee believes the decision added nothing to the rule, but simply made it clearer, and therefore does not approve the suggestion.

The Railway Club of Pittsburgh suggests that the matter of sending home worn-out and damaged cars by the shortest route be referred to the American Railway Association.

Mr. W. A. Mitchell suggests form of notice to be used in sending damaged and worn-out cars on home route cards.

The Joint Car Inspectors and Car Foremen's Association suggests changing this rule to read:

"A car unsafe to load on account of general worn-out condition due to age or decay, should be reported to its owner, who must be advised of all existing defects. He shall furnish two home route cards *by the most direct route which may be designated by the owner; the owner to pay any freight charges that may accrue after it leaves the line on which it became unserviceable."*

The Association of Transportation and Car Accounting Officers submitted the following resolutions:

"*Resolved,* That it is the sense of this Association that the transportation department of the car owner, upon inserting the home route on M. C. B. home route cards, should send written notice of the issuance of such cards to the transportation department of each railroad over which the car is routed home; and be it further

"*Resolved,* That upon receipt of the M. C. B. home route cards by the road holding the car, regular way-bill should be issued to accompany the car forwarded under the M. C. B. home route cards to the owning road.

"*Resolved,* That these resolutions be forwarded to the American Railway Association and the Master Car Builders' Association, as the recommendations of this Association."

"*Resolved,* That it is the sense of this Association that when home route cards or material for repairs are ordered from the owning road, under M. C. B. rules, such requests should be promptly acknowledged, and if not acknowledged within ten days, request should be repeated until acknowledgment is received, reference being made in each case to the date of first request. Copies of all requests should be furnished the Transportation Department of road making such request and the home route cards should be sent to the Department for the purpose of having the proper home route inserted therein, after which the cards are to be sent direct to the road making requisition for them; and be it further

"*Resolved,* That a copy of this resolution be forwarded to the Secretary of the Master Car Builders' Association, with request that it be adopted by that Association."

Mr. Jas. Coleman suggests that a committee be appointed to consider the question of home cards, etc., said committee to confer with Car Service Association.

Your Committee believes that this is a matter that should be taken up by the Executive Committee with the American Railway Association, and therefore refers it to that committee.

RULE 126, PAGE 63.

The Joint Car Inspectors and Car Foremen's Association suggest cutting out the last line and adding the following: "*except that the road damaging the car shall pay any freight charges that may accrue, car owners shall accept their own cars when properly covered by defect card. Bills for repairs shall be rendered at specified M. C. B. prices for labor and material.*"

Mr. G. A. Hancock suggests adding: "*settlement for repairs to be made in accordance with M. C. B. code of prices for labor and material.*"

These suggestions do not meet with the approval of your Committee.

RULE 127, PAGE 127.

The Joint Car Inspectors and Car Foremen's Association suggest changing rule to read:

"In case of cars of private ownership sent home on account of general worn-out condition due to age or decay, such cars shall be *billed home by the most direct route and owners pay any freight charges that may accrue after the car leaves the line on which it became unserviceable; no mileage to be paid to owners by the line on which it became unserviceable.*"

This subject is referred to the Executive Committee in connection with the suggestion under Rule 125.

RULE 128, PAGE 64.

The Joint Car Inspectors and Car Foremen's Association suggests changing rule to read:

"Private line cars sent home to owners on account of being wrecked or damaged in accident, shall be regularly billed home free of charge *by the most direct route and owner notified; any freight charges that may accrue to be paid for by the road damaging it. Car owners shall accept their own cars when properly covered by defect card. Bills for repairs shall be rendered at specified M. C. B. prices for labor and material.*"

This subject is referred to the Executive Committee in connection with the recommendations made under Rules 125 and 127.

RULE 129, PAGES 64 AND 65.

Mr. G. J. De Vilbiss suggests that "hairfelt" be omitted from this rule.

Your Committee does not approve this suggestion.

The Central Railway Club suggests that an index be prepared of the rules.

Your Committee approves the suggestion.

PASSENGER CAR RULES.

A committee, consisting of Messrs. I. S. Downing, R. S. Miller and H. E. Passmore, was named to consider what changes were necessary in the Passenger Car Rules and report its recommendations to the Arbitration Committee. The committee has performed its work and submits such changes as are thought desirable. Your Committee gives its view on the recommendations as follows:

1. Prefaced with preface of the Freight Car Rules:

Your Committee approves of this suggestion.

2. Rule 1. "Each railway company shall give to foreign cars while on its line the same care as to oiling, packing and inspection that it gives to its own cars, except in case of cars on which work is done under special agreement existing between the company owning cars and the road operating same."

This suggestion meets with the approval of your Committee.

3. Rule 6 (a). This should be eliminated.

4. Rule 6 (b). This should be eliminated.

Your Committee approves of the two eliminations suggested.

5. Rule 10. Substitute in the last line "occur" in place of "is inflicted."

The substitution referred to is approved by your Committee.

6. Rule 11 (a). Should be changed to read "Journals ¼ inch or more under the standard."

Your Committee can not approve this suggestion.

7. Rule 11 (a). Add "Size of journal to be stenciled on truck."

8. Rule 11 (b). Substitute "occur" in place of "is inflicted."

9. Rule 11 (c). Charge for car heating should be 25 cents per day for heating car.

Your Committee approves the first two suggestions, and would recommend that the charge for heating cars be increased to 15 cents per day.

10. Rule 16, Page 85. Sectional cuts of rolled steel and Boise wheel should be shown with limit dimensions indicating when wheels should be removed.

Your Committee would recommend that the limits of the different wheels, as illustrated by Figs. 1, 2 and 3, page 85, be changed from 1 inch to 1⅛ inches, and Fig. 4, page 86, be changed from 1¼ inches to 1⅜ inches, at last turning, and that text of Rule 16b be changed accordingly.

Your Committee approves of the suggestion that illustrations of rolled steel and Boise wheels, with limit dimensions, be shown in this rule.

11. Add new section to Rule 18: "Private or other cars except regular line cars when offered in interchange equipped with steam hose couplings that will not couple with the standard on the receiving line must be changed by receiving company. The hose removed to accompany car or be returned to delivering company."

Your Committee agrees to this suggestion.

12. Rule 20. The word "understood" should be eliminated.

This suggestion meets with the approval of your Committee.

13. Item No. 13, page 88, should read "anthracite coal."

Your Committee does not believe this item should be confined to anthracite coal only, and therefore does not concur in the suggestion.

14. Item No. 60, page 90, should be eliminated, the price not being used.

This suggestion meets with the approval of your Committee.

It is suggested that in item 61, page 90, the price for loss of metal from steel-tired wheels, $2.00 per 1-16 inch, is too high, and should be given attention by the Arbitration Committee.

Your Committee has considered this item, but does not approve of any change.

Rule 19, Page 87.

The New England Railroad Club suggests that this rule be amended to read as follows:

"The depreciation of all passenger equipment cars due to age shall be *figured at* 3 per cent per annum *upon the yearly depreciated value of same, to continue not to exceed 50 per cent of its original value. The above method of depreciation applies equally to either bodies or trucks of such cars.* No depreciation shall be allowed on the value of air brakes."

This proposed change meets with the approval of your Committee.

The Canadian Railway Club suggests that "sleeping cars" be omitted from item 21 in order that same may not conflict with "Pullman" rules.

Your Committee can not approve of this suggestion.

Mr. Jas. Coleman, M. C. B., Grand Trunk Railway, suggests changing cleaning prices as follows:

Cleaning outside of sleeping and parlor cars (including vestibules and trucks), $1.25.

Cleaning vestibuled passenger and combination cars, $1.50.

Cleaning common passenger and combination cars, $1.00.

Cleaning baggage and mail cars, 50 cents.

(These three items of cleaning to include both inside and outside, vestibules and trucks.)

Cleaning inside and outside of sleeping and parlor cars (exclusive of bedding), $2.50.

Rule 11, Section C, last paragraph — Canadian roads to charge 25 cents for terminal steam heat, and both prices to be shown with other prices.

Item 42 of price list. Galena car oil to be increased to 24 cents per gallon.

Item 24 of price list. Diamond S brake shoes 50 cents each. These were $1.25 each in New York Agreement, of which present M. C. B. Rules are virtually a reprint. Price list might be cut down to include only items that are pro-ratable and labor, and a paragraph inserted that repair material be charged as per M. C. B. Freight Rules.

Items 21 and 22 should be eliminated entirely, as the rates we propose above for cleaning inside and outside of sleeping and parlor cars ($2.50) and coaches ($1.50 and $1.00) are sufficient to cover this extra work when done (which in the case of cars on interchange is not very often). The existing note after these items regarding cleaning of trucks is, we think, unnecessary, as under the existing rules no extra charge is made to any cars for this work.

Your Committee believes the prices for cleaning, etc., are equitable, and that no changes should be made therein.

For the Arbitration Committee,

Jos. W. Taylor,

Secretary.

To the Members:

In accordance with the notice given at yesterday's session, a meeting of the Arbitration Committee was held in the committee-room of the

Marlborough-Blenheim Hotel at 3 o'clock yesterday afternoon, at which a number of the representatives of the different roads were present. The report of the committee on proposed changes in the Rules of Interchange was considered, and it was considered advisable to suggest the following changes and additions in addition to those proposed in its printed report:

PREFACE.

It has been called to the attention of the committee that at certain interchange points the practice exists of making local inspection rules which do not conform to the M. C. B. Rules. As it is thought the M. C. B. Association should be fully responsible, and should exercise full control over the Rules of Interchange in so far as inspection is concerned, it is recommended that a third paragraph should be added to the preface as follows:

" All inspection of freight cars for interchange will be made in accordance with the following rules: "

RULE 8, PAGE 5.

Your committee would change its recommendations to read as follows:

Seams ½ inch long or over at a distance of ½ inch or less from the throat of the flange, or seams 3 or more inches long, if such seams are within the limits of 3¾ inches, as shown on Fig. 5, page 10.

RULE 34, PAGE 14.

Your committee would modify its suggestion regarding this rule, making the rule read:

" If the car has air signal or steam pipes, the hose, pipes and couplings on the car are at owner's risk unless the car is stenciled that it is so equipped."

This proposed change is suggested in order to make the provisions regarding steam and air pipes the same.

RULE 62, PAGE 19.

Your committee suggests a modification of its recommendation as follows:

Add a new sentence reading, " malleable iron couplers, open knuckles and malleable or steel-back filled journal bearings shall not be used in repairs of foreign cars."

RULE 65, PAGE 21.

1. Your committee would make an additional suggestion, i. e., that

the size of the horizontal or cross bolts shown in Fig. 9-A should be ⅝ inch.

2. It has been called to the attention of your committee that a large number of cars have sills spliced with a butt form of splice similar to that shown in the enclosed print, which at some interchange points have been rejected as not conforming to M. C. B. standard. The claims made for this form of splice indicate that it is the equal of the present M. C. B. splice in strength, although this has not been demonstrated to the satisfaction of your committee. That cars spliced with this form of splice may be kept in service and that the form of splice may be thoroughly considered your committee would recommend the addition of the following:

" Sills of foreign cars shall be spliced in accordance with the standard form of splice shown in the M. C. B. Rules. Cars delivered in interchange with the form of splice shown herewith will be acceptable."

Your committee would suggest to the Executive Committee the appointment of a special committee to investigate the relative advantages of the two forms of splice.

The attention of your committee has been called to an evident error in the credit for journal bearings in the Passenger Car Rules as shown on page 88. This credit should be the same as in the Freight Car Rules, and it is therefore suggested that the credit for the scrap journal bearings should be 15 cents per pound instead of 11 cents per pound.

For the Arbitration Committee,

J. W. TAYLOR, *Secretary.*

MR. GAINES: Has not the committee forgotten the change in Rule 35, page 14?

THE SECRETARY: That was simply an error in the print, and will be corrected.

THE CHAIRMAN: A motion will be in order to confirm the decisions of the Arbitration Committee for the past year.

MR. SANDERSON: I move that the decisions of the Arbitration Committee be formally accepted by this Association.

MR. J. R. CADE (G. H. & S. A. R. R.): What became of the recommendation of the General Managers Association of the South relative to a proposed change in Rule 39 as to the fastening of hand and foot holds? It recommended that bolts be used in place of lag screws.

THE SECRETARY: The Executive Committee has that under consideration.

THE CHAIRMAN: You have heard the motion as stated.
(Motion seconded and carried.)

THE CHAIRMAN: The report of the committee as modified is now open for acceptance or rejection by the Association.

MR. SANDERSON: Mr. Chairman, we have got a good set of rules. I think we have all had this report to go over it thoroughly. An invitation was given yesterday by the Arbitration Committee to all those specially interested, or who had any kick coming, to come and kick. We got together and it is very desirable that the rules shall have as few changes in them as possible each year, and it is very difficult, in a large convention of this kind, to make changes wisely, as some little change in some one rule may seriously affect some other rule which has been passed over. I will move you that the report and recommendations of the Arbitration Committee with regard to the Master Car Builders' Rules, with the amendments read by our Secretary, be approved by this convention as a whole.
(Motion seconded.)

MR. MARDEN: I would like to call the members' attention to page 20. I would like to have a committee appointed on the subject which I have presented there, to report at our next meeting as to the advisability of making the change which I have recommended.

MR. BRAZIER: The Executive Committee has that power. It can appoint the committee.
(Motion carried.)

THE SECRETARY: The next matter is the return to the discussion of the report on Tests of Couplers. I may say that Mr. Muhlfeld's motion, which was seconded, is as follows:

> "That the Standing Committee on Tests of M. C. B. Couplers be requested to submit their recommendations to cover a material specification for coupler-head castings which will incorporate the chemistry or at least the maximum allowable limit of certain elements in addition to the minimum allowable cross sectional area of metal between the face and the knuckle-locked cavity, and at the junction of the guardarm to the body of the coupler head in the essential locations."

MR. SELEY: I think it will clear up the matter if Mr. Muhlfeld will state whether this action is to influence the report of the committee for this year or for the deliberation and report next year.

Mr. Muhlfeld: For the deliberation of the Standing Committee on Couplers.

Mr. Wildin: Do I understand this is for the committee to deliberate on or is it for the instruction of the committee?

The Secretary: To deliberate on, and report at the next convention.

The question was put and the motion carried.

The President: Is there any further discussion on the report?

Mr. Gaines: Without belittling in any way at all the work of any of the committees, I want to say that notwithstanding the remarks of one of the members I have prepared one or two papers for the convention and have had them in on time, and I don't believe there is any committee but what can get them in on time, and I believe furthermore if we had our meetings in December, there would be still some of them late. I want to thoroughly approve Mr. Sanderson's remarks. Several years ago I was connected with a road which had their cars equipped with dead blocks. Later they took them off. I was then a Master Mechanic and had charge of repairs on my division. I want to say that car repairs, as regards draft-rigging work, certainly did go up, and I think if we get back to a dead block it will be a good thing.

Prof. H. Wade Hibbard: I notice the very comfortable, or possibly comforting, statement on one of the pages of this report to the effect that the ordinary pulling and buffing force when train is in motion does not exceed 40,000 pounds when train is handled by one engine. I have observed that great success attends those repairmen who adopt, as their guiding principle, the anticipation of repairs, by making the parts strong previous to the breakage occurring. I believe it would be a most wise plan for this Association to have something of this idea with regard to the M. C. B. coupler. This spring I have been having some very interesting experience in connection with some tests on the Erie railroad with a Mallet compound engine. That engine has 413,000 pounds on its sixteen driving wheels. At the present time they are using it as a pushing engine. It is giving the equivalent drawbar pull of three of the largest engines they have been using as pushing engines. You gentlemen know that in some sections of the country the Mallet articulated compound is being used on the front end. I believe when the time comes, as I emphatically believe it is going to come, when our General Managers, as they talk with me, see the economies that result, will insist that those engines be used as road engines on the front end of our freight trains. When the time comes, this very comfortable statement with regard to the low drawbar pulls will be ancient history. This spring we tested one of those big engines, and those engines pushed against the dynamometer car behind the train. They were giving a drawbar push of over 70,000 pounds. What is going to take place with your drawbars when that engine is going to be put in front, as I believe it will be? I have talked with a number of General Managers and they are looking at those engines and are anticipating the savings that are going to come from the introduction of those engines as pulling engines, and I would like to put great emphasis on the consideration by you gentlemen of the recommendations of this coupler committee which look toward increased strength of the couplers. I think it will be very comfortable to the repairmen if they felt that before the Mallet compounds come as front-end engines the couplers will be ready for them.

MR. CLARK: I move that the report of the committee be accepted and its recommendations be referred to letter ballot.

(Motion seconded and carried.)

THE SECRETARY: The next order of business is the report of the Standing Committee on Revision of Rules for Loading Long Material. The chairman of the committee has asked me to read the report. It is hardly necessary to read this report in its entirety. The committee has recommended certain changes in the rules for loading long material. The report is as follows:

REPORT OF STANDING COMMITTEE ON REVISION OF RULES FOR LOADING LONG MATERIAL.

To the Members:

Your Committee on Rules for Loading Long Material, recognizing the desirability of making as few changes as possible in the present rules, have confined their attention to such rules as it would appear could be still further improved to meet the requirements. The corrections and additions we would recommend are as follows:

Rule 11.

The rule reading as it does provides for a maximum overhang of 18 feet at a width of 8 feet, 1 inch, as given in the table accompanying the rule, but it seems that shipments are quite frequently offered containing pieces exceeding that length, but not enough, perhaps, to warrant changing the general method of assembling the load on the car, which would necessarily mean providing braces and clamping pieces on the two cars in the form of a tandem shipment. At the same time it would appear perfectly feasible to load beyond this overhang, in fact up to 24 feet, provided we keep the width of the shipment to 5 feet, and provided the average length of the overhang of total load does not exceed 18 feet. This requirement seems necessary on account of preserving the center of gravity of the shipment, and putting the rule in this way makes it entirely clear for the average inspector.

New Rule 11.

The width of overhanging load placed on single cars must never exceed the following dimensions. When all the pieces are of approximately the same length the length of overhang should not exceed eighteen (18) feet, but shipments may contain pieces overhanging as much as twenty-four (24) feet provided the average length of the overhang of the total load does not exceed eighteen (18) feet.

Length of Overhang.	Width of Load.	Length of Overhang.	Width of Load.
C	W	C	W
9 ft. 0 in.	9 ft. 5 in.	18 ft. 0 in.	8 ft. 1 in.
10 " 6 "	9 " 2½ "	19 " 6 "	7 " 0 "
12 " 0 "	9 " 0 "	21 " 0 "	6 " 4 "
13 " 6 "	8 " 9½ "	22 " 6 "	5 " 8 "
15 " 0 "	8 " 7 "	24 " 0 "	5 " 0 "
16 " 6 "	8 " 4 "		

The overhang is measured from center of truck to extreme end of overhang. See Figs. 23 and 24.

RULE 13.

The rules now provide that the top of stakes be tied together with either boards of specified dimensions or with a specified number of strands of good ⅛-inch diameter wire. But it would seem that some latitude should be consistently given in this respect by allowing the use of another diameter of wire so long as the strength of the tie is preserved. With this in view it has been suggested that we also provide for the use of a 3-16-inch diameter wire where found more convenient, substituting it for the specified wire, using the equivalent number of strands as shown in the following:

Addition to Rule 13.

Three-sixteenth-inch diameter wire will be accepted as a substitute throughout the rules, provided the ends are securely twisted:

Two strands or 1 wrapping of 3-16-inch wire will be equivalent to 6 strands (3 wrappings) ⅛-inch diameter wire.

Four strands or 2 wrappings of 3-16-inch wire will be equivalent to 10 strands (5 wrappings) ⅛-inch diameter wire.

RULE 15-E.

Notwithstanding a number of shipments are offered which are more or less flexible and necessarily require the sliding as well as the bearing pieces, at the same time there are also a number of shipments stout enough of themselves to hold up clear of the intermediate portion of the car or braces. It is therefore recommended that the rule be made more explicit by changing it to read as follows:

NEW RULE 15-E.

"For twin or triple loads of long flexible material, which require more than two sliding pieces in addition to the bearing pieces, the weight of lading must not exceed one-half the capacity of the car if load consists of plates or similar lading, as per Fig. 43. Structural material of less flexibility, such as heavy channels and 'I' beams, must conform to Rules 15-A and 15-B, and should be loaded as per Figs. 41 and 42."

RULE 31.

Reference to Fig. 11 at the top of page 15 should be omitted.

Paragraph following table on top of page 15 referred to "Loads as per Fig. 11" should be omitted, as the conditions of equipment existing at the time this rule was framed seem to be disappearing and the requirements are fully covered in Rule 15 with its several sections.

RULE 69.

The latter part of this rule reading: "When such shipments are loaded in stock or box cars, it must be placed crosswise of car at doorways," referring to closed equipment, found its way into the rules by mistake and should be omitted from this portion of the rules but will be hereinafter referred to.

Fig. 23.

Reference should be made to Rules 11, 73 and 77.

Fig. 24.

Reference should be made to Rules 11, 73 and 77.

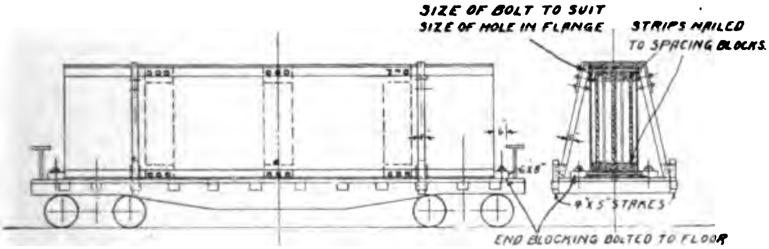
RULE 75.

In order to insure security of shipments of deep girders the recommendations are that the following general instructions be provided and made a part of the rules, making it Rule 75-A, and also adding its cut as Fig. 31-A.

FIG. 31-A

MANNER OF LOADING DEEP GIRDERS ON FLAT CARS.

RULE 75-A.


SIZE OF BOLT TO SUIT SIZE OF HOLE IN FLANGE
STRIPS NAILED TO SPACING BLOCKS.
6"x8"
4"x5" STAKES
END BLOCKING BOLTED TO FLOOR

NEW RULE 75-A.

"Deep girders, whenever possible, should be loaded horizontally. Girders having a depth of more than two and one-half (2½) times the base, if loaded vertically, must be blocked apart to prevent overlapping of flanges and tied together to prevent independent side motion. See Fig. 31-A. This tying should be sufficiently strong and secure to practically combine all the girders so that they must act as one piece. In addition the load must be carefully blocked to prevent shifting sidewise or endwise."

RULE 77.

In this rule reference should be made to the length of overhang and total length of load, also to Figs. 23 and 24, making the rule read as follows:

NEW RULE 77.

"If overhang (C) exceeds one-third (1-3) the total length (L) of load as per Figs. 23 and 24, the opposite end must be securely bolted through bearing-piece to floor by means of seven-eighths (⅞) inch bolts."

RULE 89.

The clause reading "they must be braced to prevent shifting sidewise" should be inserted after the word "Car" in fourth line and then follow with present reading of rule.

After this is inserted the rule should be closed by adding the following clause: "Wooden underframe cars with two truss rods must not be loaded in this manner."

NEW RULE 89.

"When plates are loaded on single cars, except all steel and steel underframe designs, and the lengths of the plates are such that it becomes necessary to lap the plates on each other at the center of the car, they must be braced to prevent shifting sidewise and bearing-pieces not less than six (6) by eight (8) inches in section and in length corresponding to the distance between the sides must be placed on the floor of the car above the cross bearers to prevent the breaking down of center sills and stringers as shown in Figs. 37 and 38. Wooden underframe cars with two truss rods must not be loaded in this manner."

RULE 90.

In the latter part of this rule it is provided that when the load consists of "I" beams measuring 18 inches and over or similar material lying flat on bearing pieces, or when there is danger of the flanges cutting into the bearing pieces, the webs of such material should be supported by web pieces, etc. The suggestion has been made that this method of loading be not limited to 18 inches; on the contrary the rule should be made sufficiently flexible to take care of "I" beams of any dimensions, provided the load is less than 40,000 pounds per bearing-piece, which would be taken care of by making the latter part of the rule read:

"When lading consists of 'I' beams or similar material lying flat, and the load is 40,000 pounds or more per bearing piece, or when there is danger of the flanges cutting into the bearing pieces, the webs of such material must be supported by web pieces or the lading must be placed on pivoted bolsters."

RULE 98.

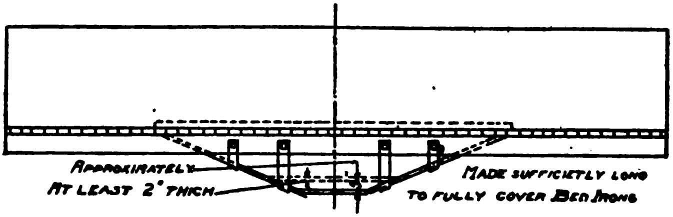
Provision should be made in this rule for the necessary chocking to prevent end and side motion for such shipments, and the rule would then read:

NEW RULE 98.

"Rails, bar iron, channels, angles, etc., should, whenever possible, be loaded on single cars inside of end gates, which must in all cases be raised and securely fastened. Rolling freight must be chocked to prevent side and end motion."

Fig. 45.

Diagram of Hopper Bottom Car, showing the application of false bottom for the loading of Pig Iron Billets, Small Castings Etc.



A rule should be provided for the loading of pig iron, short billets, and the recommendations are that the following rule should be inserted with its cut as Rule 98-A and Fig. 45-D.

New Rule 98-A.

"Pig iron, short billets, small castings, and material of similar character, should, as far as practicable, be loaded in flat floor gondola cars, and the door openings need not be boarded over. The lading, however, must be loaded over the bolsters. But, should a few pieces not exceeding one layer in depth shift over doors in transit, be the doors either flush with top of floor or bottom of sills, the shipment will be considered acceptable provided the doors and door mechanism are in good condition. Drop-end gondola cars must have the end gates raised and secured.

"When flat cars are selected the lading must have end and side protection, consisting of plank of sufficient height and at least 2 inches in thickness placed against stakes spaced not more than 6 feet apart, and of the required dimensions as per Rule 12.

"When hoppers or self-cleaning hoppers are selected the doors must be securely boarded over as per Fig. 45-A."

Rule 104.

Add another section to Rule 104, making it Rule 104-A, reading as follows:

New Rule 104-A.

"Strutts must be neatly fitted and driven into place."

RULES GOVERNING LOADING STONE.

Rules 118, 119 and 120.

In order to better take care of the shipments of small as well as large stone it is recommended that the three above rules be reconstructed so as to make the requirements clearer to the inspectors, at the same time cover a larger variety of loads offered for shipment.

RULES GOVERNING LOADING OF STONE AND BRICK ON OPEN CARS

118. Small stone, such as rip-rap, spawls, paving blocks, brick, tiling, etc., should be loaded in gondola cars. The lading may be loaded over drop doors, not boarded over, provided the doors and door mechanism are in good condition.

119. Flagging, dressed or sawed stone, such as building granite, marble and similar stone, should be loaded in gondola cars, and must rest on two or more softwood strips of sufficient thickness, placed flat and crosswise of car, to keep stone clear of floor.

If loaded on flat cars in piles not over thirty (30) inches in height, the lading must, in addition to prescribed stripping, have side and end protection consisting of hardwood plank or cross braces of at least 1-inch thickness nailed against inner side of stakes to the height of lading. When the lading is over thirty (30) inches in height the same precaution must be taken with reference to end and side protection, but stakes must extend at least four (4) inches above lading and tops of opposite stakes must be wired together with two wrappings, equal to four strands of good ⅛-inch diameter wire. Stakes must be spaced not more than 4 feet apart, and of the required dimensions as per Rule 12.

If flat cars are used for the shipment of sawed stone, such as trimmings, coping, etc., used for building purposes, the longer lengths should be placed to the outside of the lading and the shorter lengths placed inside.

120. Large flagging, block, breakwater or grindstones, with approximately straight as well as any with uneven faces must be loaded in cars with substantial side and end protection, must be well chocked and wedged to prevent shifting and rocking, and must rest on wood strips of sufficient thickness placed crosswise of car to keep stone clear of floor as provided in Rule 119.

If loaded on flat cars, the lading must, in addition to the prescribed stripping, be secured with hardwood stakes or cleats, to prevent side and end shifting, as per Rules 12 and 119, Figs. 62 and 63.

RULE 121.

This rule governing the loading of boiler shells and tanks, in its present shape does not seem to be either fully explicit or to cover the requirements. The following substitution is therefore recommended:

NEW RULE 121.

RULES GOVERNING THE LOADING OF CYLINDRICAL BOILER SHELLS AND TANKS.

"Lading of this description eight (8) feet or less in diameter, when loaded on single flat or gondola cars, should be substantially staked and chocked with blocking in height equal to one-seventh (1-7) the diameter of the shell. When the cylinder or shell is more than eight (8) feet in diameter the same precaution should be taken with reference to staking and blocking, and in addition to that it should be secured with two bands of not less than three-quarter (¾) inch round iron or flat bands of equal section.

"When such lading is placed upon two or more cars as a tandem shipment it should be secured with two bands of not less than seven-eighths (⅞) inch round iron or flat bands of equal section in addition to the prescribed blocking."

NEW RULE 122.

It is recommended that the following rule be added to No. 122 with its cut, Fig. 64:

"Large pieces of plate glass carried on flat cars should be loaded vertically, if practicable, and substantially secured by cleats on the floor end and side braces as provided for in Fig. 64."

NEW RULE 123.

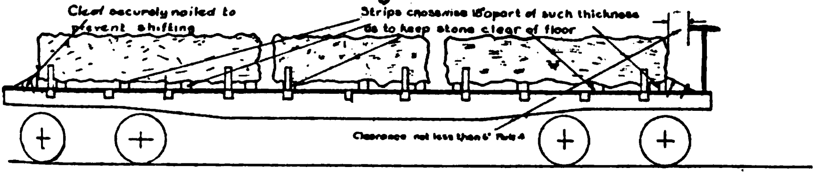
It is recommended that the following rule be added as No. 123:

"Cars with racks, when loaded with material such as scrap junk, should have the space between the slats sufficiently sealed to prevent loss of material, or ends of pieces working through, and the top of load should be securely tied down with a sufficient number of strands of good one-eighth (⅛) inch diameter wire to prevent any of the lading from rolling off."

NEW FIG. 62.

It is recommended that new Fig. 62 be added showing lading of stone as per Rule 118.

Fig 62.

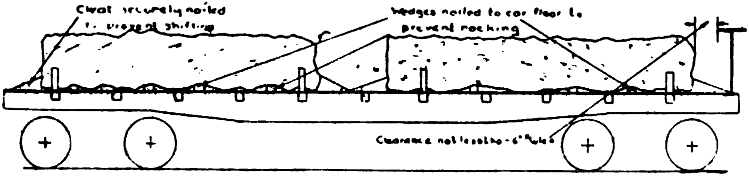

Cleat securely nailed to prevent shifting
Strips crosswise 1/2 apart of such thickness as to keep stone clear of floor
Clearance not less than 6" Rule 4

See Rule .118.

NEW FIG. 63.

It is recommended that new Fig. 63 be added showing lading of stone as per Rule 119.

Fig 63.


Cleat securely nailed to prevent shifting
Wedges nailed to car floor to prevent rocking
Clearance not less than 6" Rule 4

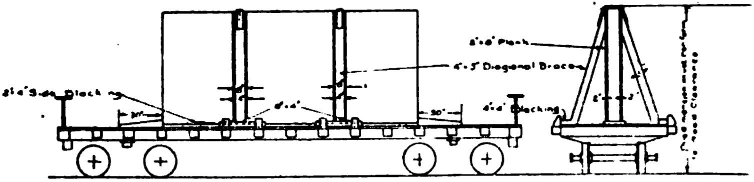
See Rule 119.

New Fig. 64.

It is recommended that new Fig. 64 be added showing lading of plate glass as per new Rule 122.

Fig. 64.

Lading of Plate Glass on Flat Cars



This completes the recommendations your Committee have determined upon during the past year for the improvement of the rules pertaining to the loading of material on open cars, and they are now respectfully submitted for your consideration. There are, however, two other matters that should be mentioned: first, the proposition made on the part of the Committee on Standards, from whom we received a communication some time since asking that we bring before the Committee for consideration and recommendation the advisability of advancing the rules from that of recommended practice to standard of the Association. The other subject is the consideration of a number of rules covering suggestions for loading material in box and stock cars, where the doors are left open so that the inspector can readily make the necessary examination.

As for advancing the rules from recommended practice to standard the majority of the Committee would favor that recommendation and, in point of fact, believe it would indeed make but very little difference from the way it is now handled at interchange points, except some change might be brought about in the matter of responsibility, and, we assume, the cost of reloading and restoring the shipments to a condition satisfactory to the rules. It is also true that while the present rules are considered safe they simply represent methods generally recognized as being good practice, and it is reasonable that variations can be made in detail still preserving the integrity and safety of the shipments. Whether this condition will open up possibilities for unnecessarily holding up traffic and improper billing is a matter that should receive the most careful consideration. However, it is the recommendation of the majority of the Committee that they be advanced from recommended practice to standard.

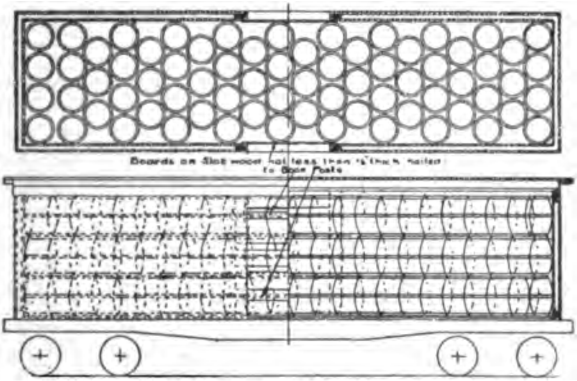
The general rules and recommendations alluded to for loading some of the more prominent commodities in closed cars have been prepared, and are submitted herewith for such action as you may deem advisable. While your Committee is mindful of the fact that the subject, as it was given the Committee and as it has been handled heretofore, specifically covers the loading of material on open cars, this phase of the proposition seems to be more or less a live one and therefore pertinent to the general subject, as many roads now seem to view these rules as wise recommendations, and generally, methods or requirements that should be issued for the information and guidance of inspectors. It is the recommendation of your Committee, however, not that they be made a part of the existing rules for loading long material on open cars, but be shown as an Appendix under the heading of—

RULES FOR LOADING MATERIAL IN BOX OR STOCK CARS WHERE THE OPPORTUNITY IS PROVIDED FOR INSPECTION.

The Rules recommended for this *Appendix* are as follows:

Rule 1. Barrels should be loaded in accordance with Fig. 1. If the barrels do not fully fill the space they should be chocked, to prevent sliding and rolling.

Appx. Fig. 1.

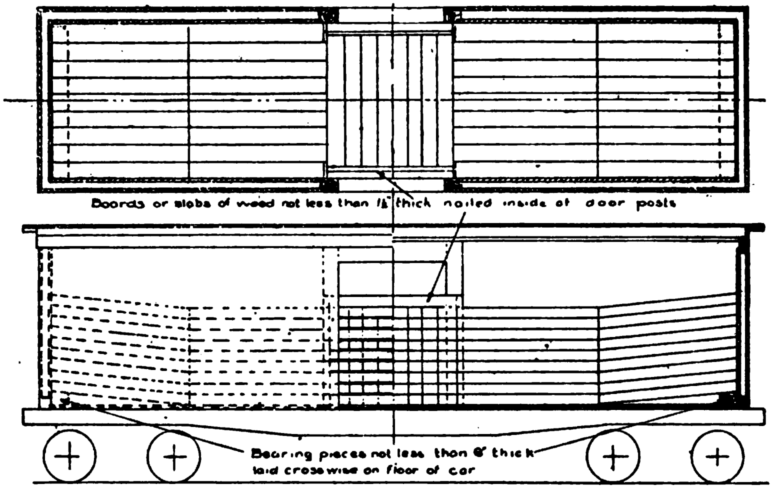

Boards on Slat wood not less than ¾" thick nailed to Door Posts

Manner of Loading Barrels in Box or Stock Cars.

RULE 2. Barrel staves, ties, fence posts, wooden billets and similar short wood should be loaded in accordance with Fig. 2. Good sound pieces of lumber spaced not more than 2½ inches apart should be used across door openings.

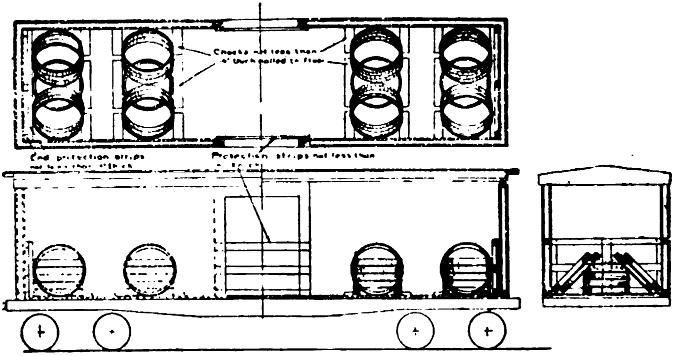
RULE 3. Tires must be loaded in piles, each pile consisting of tires laid on top of each other, and inclined tires tipped against those lying flat, keying them in place as per Fig. 3.

Appx. Fig. 2.


Boards or slabs of wood not less than 1½" thick nailed inside of door posts
Bearing pieces not less than 6" thick laid crosswise on floor of car

Manner of Loading Ties, Fence Posts, Wooden Billets, Barrel Staves and Similar Short Wood in Closed Cars.

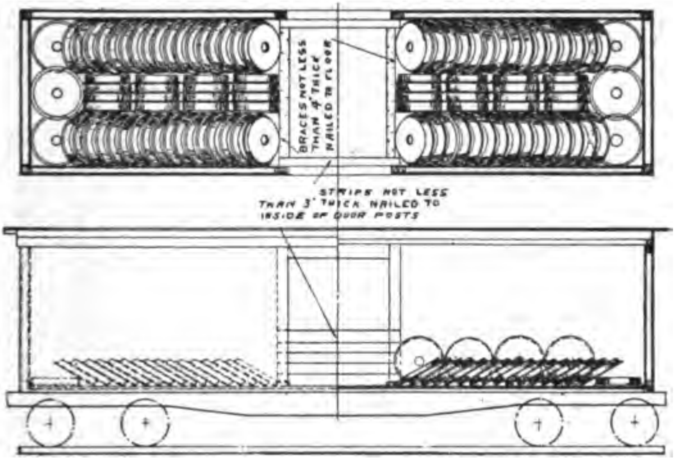
Appx. Fig. 3.


Cleats not less than 4" thick nailed to floor
End protection strips
Protection strips not less than

Manner of Loading Tires in Box or Stock Cars.

The bottom tire of each pile must be chocked to prevent sliding. The ends of car must be protected by boards or slab wood, not less than four inches thick, extending from side to side of car and spaced not less than four inches from end sheathing by vertical pieces to which the protection strips must be secured. The door openings must be protected by means of strips not less than four inches thick nailed to inside of door posts.

MANNER OF LOADING WHEELS IN CLOSED CARS
APPENDIX FIG. 4.

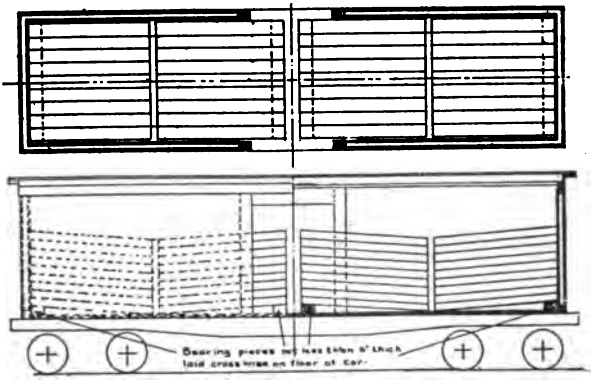

BRACES NOT LESS THAN 4" THICK NAILED TO FLOOR
STRIPS NOT LESS THAN 3" THICK NAILED TO INSIDE OF DOOR POSTS

RULE 4. Car wheels should be loaded as per Fig. 4. At end of car the wheels should be laid flat, then two rows one on each side of car, touching side lining and inclining toward center of car should rest against those loaded flat. The space between the two rows must be blocked apart, either by wheels placed longitudinally or by means of chocks. Chocks not less than four inches thick should be used to block the wheels nearest center of car, and door openings must be protected by strips not less than three inches thick nailed to inside of door posts.

RULE 5. Ties, fence posts, wood billets, cord wood, lath, tan bark and similar material when loaded in closed cars, must be loaded longitudinally, except at door openings, where it must be placed crosswise to to the full width of car if the length of pieces will permit. If the pieces are tapered they must be loaded with tops and butts alternating. The crosswise tiers should incline toward the center of car and the ends of longitudinal tiers nearest the end of car must be raised resting on pieces not less than six inches thick laid crosswise on floor of car. Boards or slab wood not less than one and one-half inches thick must be nailed inside of door posts to full height of load, to prevent load from coming in contact with door. See Fig. 5.

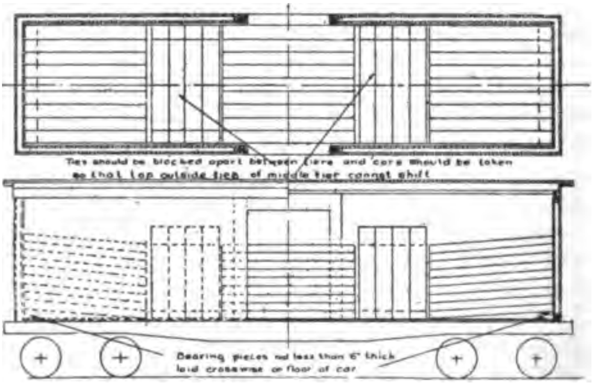
RULE 6. Ties eight feet or more in length, or similar material which can not conform to Rule 5, may be loaded longitudinally in four tiers as per Fig. 5, in which case the ends of the tiers projecting into the doorway must be raised and rest on pieces not less than six inches thick laid crosswise on floor of car. If the length of car is such that ties can not be piled in four tiers, three tiers may be used as shown in Fig. 6,

Appx. Fig. 5.


Bearing pieces not less than 6" thick
laid crosswise on floor of car.

Manner of Loading Four Piles of Ties in Closed Cars

Appx. Fig. 6.


Ties should be blocked apart between tiers and care should be taken
so that top outside ties of middle tier cannot shift
Bearing pieces not less than 6" thick
laid crosswise on floor of car

Manner of Loading Three Piles of Ties in Closed Cars.

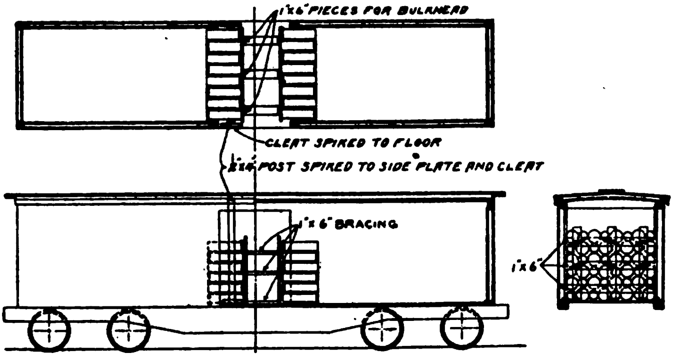
in which case the spaces between the tiers must be blocked to prevent end shifting of the middle tier. When loaded in three or four tiers, as indicated, the protection strips need not be applied.

Rule 7. For all other lading which would roll or easily slide, unless otherwise specified when doorways are partly or entirely open, or when they are covered with ventilated or screen doors, slats six inches wide by one inch thick, or their equivalent, or slab wood not less than one and one-half inches thick at the center, must be nailed to inside of door posts and must be spaced sufficiently close to floor of car and to each other to positively prevent any of the lading from passing between them.

Rule 8. Cars equipped with protection slats nailed to outside of door posts, or to door will not be accepted.

Rule 9. Material such as scrap junk when loaded in stock cars must have the spaces between the slats sufficiently sealed to prevent loss of material or ends of material working out through the spaces.

Rule 10. Sewer pipe, drain tile, etc., in closed cars should be loaded in tiers, separated by lath or similar material. The space between the tiers at door opening should be braced as per Fig. 7. When one-half or more of one length of pipe extends beyond door opening such tier must be protected on each side by means of sound wood two inches by four inches in section nailed to inside of plate and secured at floor by means of cleats spiked to floor of car. If full length of pipe extends


MANNER OF LOADING SEWER PIPE IN CLOSED CARS.
APPENDIX FIG 7.

1"x6" PIECES FOR BULKHEAD
CLEAT SPIKED TO FLOOR
2"x4" POST SPIKED TO SIDE PLATE AND CLEAT
1"x6" BRACING
1"x6"

beyond door openings, such tier must be protected by two pieces of two inch by four inch sound wood on each side, secured as specified above for single piece on each side.

A. Kearney, Chairman,
L. H. Turner,
W. F. Kiesel,
G. S. McKee,
F. H. Clark,
C. E. Fuller,
A. Stewart,
J. S. Lentz,
Committee.

Roanoke, Va., June 1, 1908.

(President Dow in the chair.)

Mr. Clark: I move that the reading of the report be omitted and that it be referred to letter ballot.

Mr. Sanderson: Before that motion is voted on — it is very often the case that these things do not impress one when you read them over — I would like to ask the chairman of the committee if he will, in a few words, call attention to any important changes that have been made.

Mr. A. Kearney (N. & W. Ry.): I do not think there are any features or points of particular interest in this report except those contained in the latter part, but briefly, Rule 11 provides, as will be seen, for an extension of the overhang from 18 feet, which has been the recognized figure for some years. It was thought wise to extend this dimension to 24 feet, and the suggestion, as I remember it, was made on the part of the Lehigh Valley Railway. The idea was considered a very good one. On page 2, under the New Rule 11, will be found the revision as proposed.

Rule 13, as you will see, now provides for the use of wire ties of 3-16 inch as well as ⅛ inch diameter. To reach this conclusion equivalents were worked out and the rule changed accordingly. Although these equivalents are shown in this place only, the substitution is permitted throughout the entire code.

Referring now to Rule 31. Note mentioning Fig. 11 at the top of the page was a mistake and should be omitted.

Rule 69, toward the latter part, reads " When such shipments are loaded in stock or box cars, it must be placed crosswise of car at doorways." However, this clause refers to closed equipment and has been taken care of in that portion of the code.

All notes accompanying Fig. 23 should, as has been taken care of, refer to Rules 11, 73 and 77, all of which makes it very much more comprehensive for the inspectors. Fig. 31-A — The new rule is very clear and shows what should be done in such cases as referred to. Rule 75-A has been introduced. It was thought well to do this on account of some reported accidents where attempts had been made to carry large deep girders. In the body of the rule it will be observed a description is given showing how the tie should be made, etc., all of which seems very clear.

In Rule 77, we simply refer back to Rules 23 and 24 for the general guidance of the inspectors and it very materially helps him to locate the instructions covering such shipments.

While there may be a few other points that should be mentioned, they are not of very great importance, and we might pass on to the appendix, as that, after all, contains the real matter we would like to lay before you for your consideration. Turning now to the latter part of the report, page 8, where it reads, " This completes the recommendations that your committee have determined upon during the past year," etc.— the majority of the committee recommended that these rules for loading long material be advanced from recommended practice to that of standard. All the committee voted in the affirmative on this point except Mr. Stewart, of the Southern Railway, and doubtless his recommendation was made after due consideration of the conditions. I promised him, however, I would mention this fact. On page 12 we refer to the transportation of commodities requiring the use of box and stock cars. It was not the idea of your committee that it would be well to put these rules pertaining to loading material in closed cars in the body of the code, but that they should be added as an appendix. It should, perhaps, be mentioned that these rules for closed equipment have now been in use by a number of roads and their present reading is what has been thought would give us safe requirements.

Concluding the report, therefore, we have two questions before us and they are questions you will have to decide. The first is the advancement of the rules from a recommended practice to that of standard, and the second is how do you wish handled the new rules pertaining to the loading of material in closed cars.

MR. SANDERSON: These points ought to be settled before the vote is taken.

MR. KEARNEY: That is the recommendation of the committee and I will put it as a motion that the rules we have here prepared showing regulations for carrying material in closed cars be made a portion of the rules and not carried as an appendix.

MR. SANDERSON: I second that motion.

(Motion carried.)

THE PRESIDENT: The next motion, which was seconded, is that the recommendations of the committee be referred to letter ballot.

(Motion carried.)

THE PRESIDENT: The question has been raised as to whether these rules for loading long material should be raised from recommended practice to standard. I presume it would be well to refer that question to letter ballot.

MR. FOWLER: I make a motion to that effect, Mr. Chairman.

MR. SANDERSON: I want to suggest that there is a better way of doing it than of advancing them to standard. If they are made rules of interchange they would be much more effective, and they are practically rules of interchange to-day. We all interchange cars of different kinds that are not M. C. B. standards. Those standards are not always applicable to different cases. These rules are really rules of interchange, and if you want to make them binding absolutely, and they are practically so to-day, what we need to do is to make them and transform them into rules of interchange and not make them standards. They will not have more force as standards than they have to-day.

THE SECRETARY: I would like to say that it would require a notice from every railroad in the country to the effect that they are willing to subscribe to the rules, before we could make them a part of the rules of interchange. The motion is that they be referred to letter ballot for adoption as standard.

(Motion carried.)

The President: The next report is the report of the Standing Committee on Cast-iron Wheels. I believe Mr. Garstang, the chairman, is not here. Mr. B. D. Lockwood, his mechanical engineer, is here, and perhaps it would be well for him to read or abstract the report.

Mr. Lockwood here read the report of the Committee on Cast-iron Wheels as follows:

REPORT OF COMMITTEE ON CAST-IRON WHEELS.

To the Members:

Your Standing Committee on Cast-iron Wheels reports the following outline of work accomplished since the 1907 convention:

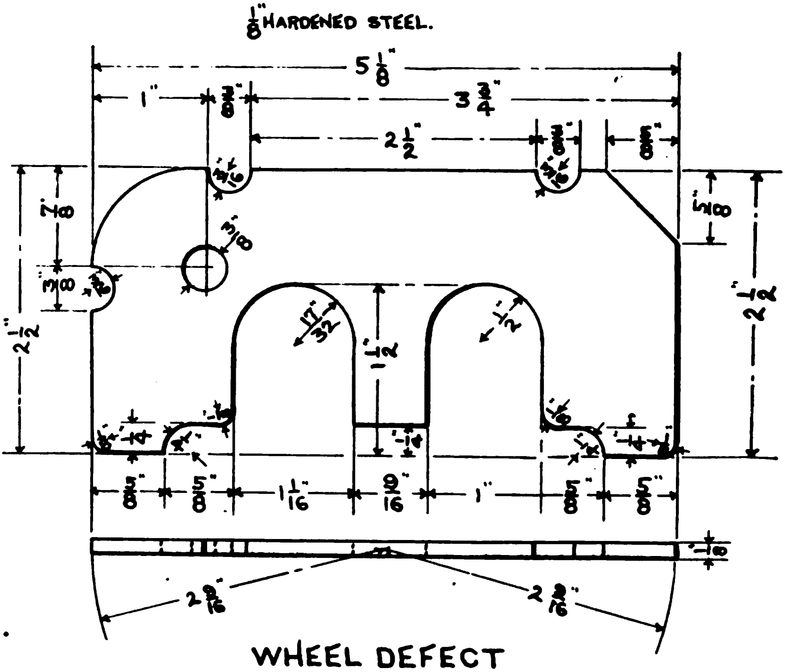
The recommendations of the Committee, in its report for 1907, having been submitted to letter ballot and accepted as an entirety by the Association by affirmative vote on each and all of the recommendations, has limited the Committee in its work during the past year to suggested additions, alterations and revisions pertaining to the subject, presented by Secretary Taylor, as well as individual members, as follows:

WHEEL DEFECT AND WORN COUPLER LIMIT GAUGE.

Now appearing on M. C. B. Sheet 12, and showing three slots for gauging worn wheel flanges, has been recommended for revision as shown on WC-1908-3 with two slots for gauging worn flanges, for the following reasons: The Worn Coupler and Wheel Defect Gauge, as presented to the Association in 1907, in which 1 inch, 1 1-16 inch and 1⅛-inch slots for gauging worn flanges was shown, has, on account of the ⅜-inch radius used, been criticized for the reason that the fillets at the throat of worn wheels on which this gauge would be used, differ from the radius on the gauge, thereby preventing the latter from properly seating in the throat and resting on the tread, which results in the gauge not being applied perpendicularly and renders the uniform condemning of wheels an impossibility, notwithstanding that the ⅜-inch radius recommended by the Committee is very much closer to the actual fillet in the throat of worn wheels than the radius used on the M. C. B. gauge, which was standard prior to the Committee's report.

This gauge has been further recommended for revision in the elimination of the 1⅛-inch wide slot for condemning wheels under 100,000 pounds capacity cars.

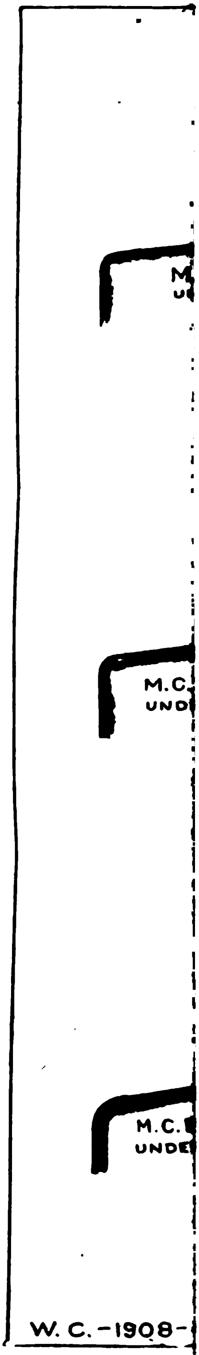
Your Committee, in investigating both points above referred to, are unanimously of the opinion that both are well taken and they hereby present Sheet WC-1908-3 and WC-1908-4, showing a proposed new gauge and method of using same to cover the above points, and which it is possible to use in condemning worn M. C. B. Standard Wheels alike, notwithstanding whether they have the standard flanges in vogue up to 1906 or the strengthened flange of wheels cast under the standard of 1907.



WHEEL DEFECT
AND
WORN COUPLER LIMIT GAUGE.

FIG 1.

W. C. 1908—3.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SHAPE OF BRACKETS OR RIBS.

The present "M. C. B. Recommended Practice" for Cast-iron Wheels as shown by Sheet "J," which requires fourteen brackets supporting the tread and flange at the back face of the wheel adjacent to the single-plate portion, has been criticized for the position of the brackets, which it is claimed does not follow good foundry practice, and also for their shape, which it is stated, permits unequal strains to be set up in the wheel when cooling. Attention having been invited to these details by Mr. Muhlfeld, your Committee, after investigation, is unanimous in their opinion that both are well taken, and hereby present Sheet WC-1908-5 as covering the desired changes.

Your Committee's attention was also invited by Mr. Muhlfeld to the question of regulating foundry practice in the manufacture of cast-iron wheels to promote uniformity of product in the different sections of the country in order that wheels applied under interchange rules, regardless of the place of manufacture, would have the same chemical characteristics as well as physical properties under the M. C. B. Specifications. The importance of such action on the part of the M. C. B. Association, providing a harmonious and concerted action on the part of the wheelmakers can be secured, would greatly benefit interchange service between the railroads forming this Association, particularly on account of the heavy capacity cars now in general use, but owing to the lateness of the hour at which this point was presented, and the impossibility of securing coöperation of the wheelmakers, your Committee does not feel that sufficient data regarding foundry practice in charging cupolas with particular reference to the percentage of new pig-iron, scrap wheels, etc., and the ladle analysis of the molten metal can be secured, unless a harmonious and concerted action on the part of the wheelmakers working jointly with your Standing Committee can be arranged; and their joint labors with this end in view would consume not less than one year in formulating a definite report. Your Committee has, therefore, no recommendations to make on this phase of the subject.

Your Committee, under date of May 5, 1908, was furnished by Secretary Taylor, two letters referring to the work on which this Committee was engaged, and particularly directed to points appearing in the "Code of Rules Governing Interchange," printed in 1907, which had been drawn to the attention of the Committee on Standards as well as the Arbitration Committee, and your Committee begs to say that if the recommendations in its report for 1907 had been followed by the Arbitration Committee and the Committee on Standards, all of the points, with one exception, in the two letters mentioned, would have been found to be fully covered and the necessity for the letters would not have arisen. We will, however, repeat these items from the report of 1907 in this report under the heading of Recommendations, which will appear later.

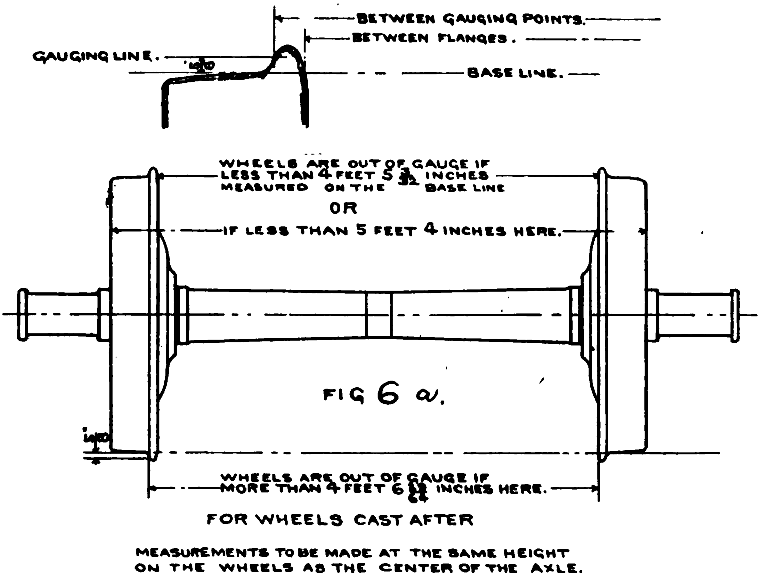
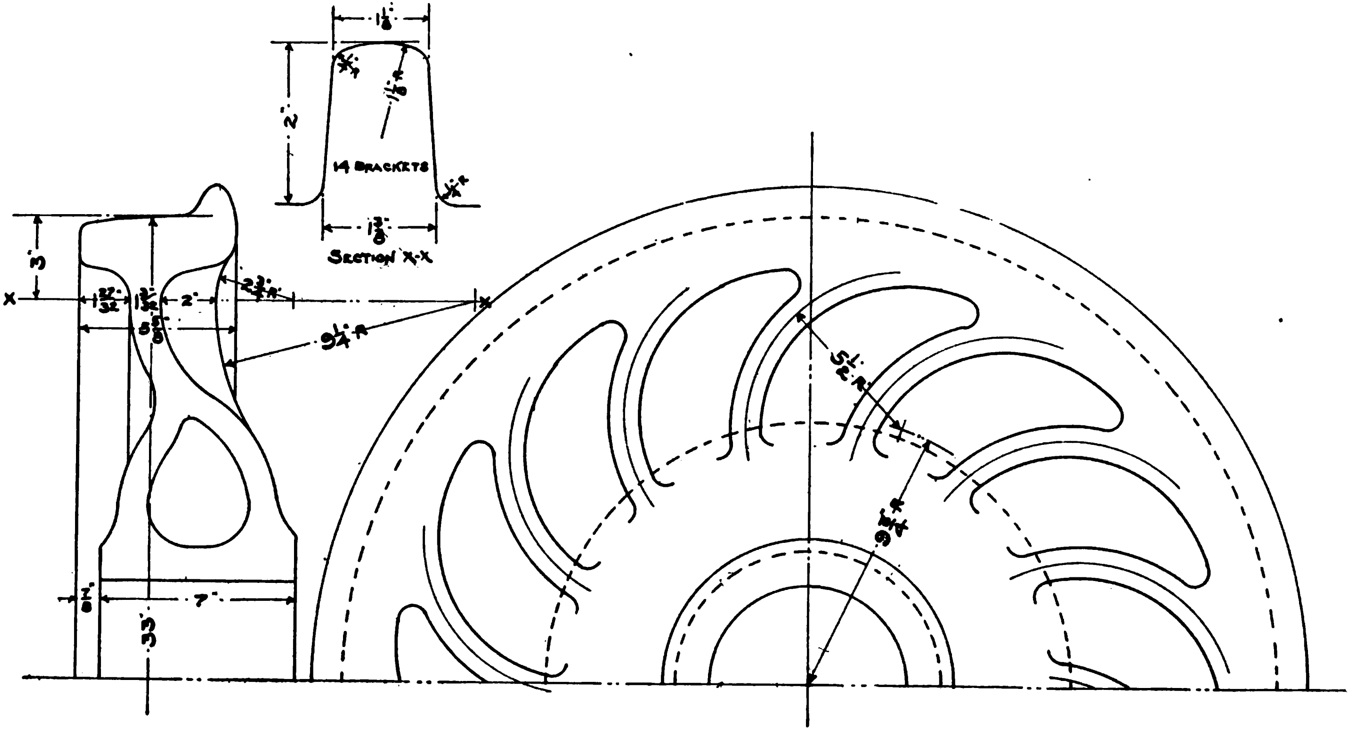

BETWEEN GAUGING POINTS.
BETWEEN FLANGES.
GAUGING LINE.
BASE LINE.
WHEELS ARE OUT OF GAUGE IF LESS THAN 4 FEET 5 $\frac{3}{32}$ INCHES MEASURED ON THE BASE LINE
OR
IF LESS THAN 5 FEET 4 INCHES HERE.
WHEELS ARE OUT OF GAUGE IF MORE THAN 4 FEET 6 [illegible]/64 INCHES HERE.
FOR WHEELS CAST AFTER
MEASUREMENTS TO BE MADE AT THE SAME HEIGHT ON THE WHEELS AS THE CENTER OF THE AXLE.

FIG 6 a.

W. C. 1907 — 6.

The attention of your Committee has been directed to the fact that none of the cuts published in the Proceedings show in detail with necessary dimensions the contour of the tread and flange for steel tires. The suggestion has been made that M. C. B. Sheet A of Recommended Practice be revised to show in detail with all necessary dimensions the contour of the tread and flange for steel tires, and the title of the sheet altered to include "Tread and Flange for Steel-tired Wheels." Your Committee is of the opinion that this should be done, making the same correspond to the contour of the wheel tread and flange (from the outside of the tread to the point of the flange only) shown on M. C. B. Sheet A of Recommended Practice and now used for cast-iron wheels. Action on this point should be taken by the Association, as it is beyond the province of this Committee to include same in its recommendations.

In concluding our report to the Association in 1907, the Committee recommended that a service record of the performance of the new wheels be maintained by the members of this Association, for a sufficient period of time to determine what the wheels would do under the increased wheel loads and mileage, so that, if it was desired by the Association to adopt a guarantee, that the actual performance of the wheels could be used in determining what the guarantee should be. After one year's experience with the new wheels, your Committee is of the opinion that at least the leading railroads of this country have complied with this request and that there is now sufficient data in the hands of the individual members that



PROPOSED STANDARD POSITIONS OF BRACKETS OR RIBS FOR 600, 650 AND 700 POUND WHEELS.

W. C. 1908—5.

can be used by the Committee in framing a proposed guarantee, provided the Association votes that one be framed.

The recommendations of your Committee, together with the revised drawings, are presented in the following, and at the conclusion of same we quote from our 1907 report *certain rules and paragraphs that need revision* to make them conform to the requirements of the new standards, and recommend that the latter be referred to the Committee having these rules in charge for the necessary corrections.

WHEEL DEFECT AND WORN COUPLER LIMIT GAUGE.

Marked WC-1908-3, to replace cut of worn coupler limit and wheel defect gauge, now appearing on M. C. B. Sheet 12.

METHOD OF USING WHEEL DEFECT AND WORN COUPLER LIMIT GAUGE.

The above marked WC-1908-4, and to be printed in the Code of Rules Governing Interchange of Traffic.

SHAPE AND POSITION OF BRACKETS OR RIBS FOR CAST-IRON WHEELS.

The above marked WC-1908-5, and to supersede the brackets now appearing on Sheet J of Recommended Practice *for radius and position in plan only.*

The following recommendations are quoted from your Committee's report for 1907, and to which attention has previously been called.

DIAGRAM SHOWING MEASUREMENTS FOR MOUNTED WHEELS, COVERING WHEELS LOOSE OR OUT OF GAUGE.

The above marked WC-1907-6, and is an addition to cut, Fig. 6, now appearing in Code of Rules Governing Interchange of Traffic, and particularly referred to in Rule 17.

(This new cut, Fig. 6-A, should be printed in Code of Rules.)

The drawings of the wheel as a whole, as presented, and the printing of the cuts for each weight of wheel on separate sheets, at large scale so that all dimensions may be easily read.

The printing of cuts of the wheel tread and flange as presented to be at large scale to enable dimensions to be easily read.

(Both the above should be done and proofs submitted to your Committee before printing.)

Rule 17, Page 487 (1906 Proceedings), to agree with Fig. 6-A, Sheet WC-1907-6.

Respectfully submitted,

WM. GARSTANG, Chairman,
A. S. VOGT,
H. J. SMALL,
W. E. FOWLER,
R. L. ETTENGER,
R. F. MCKENNA.
Committee.

Mr. Lockwood: In connection with the paper as printed, in the absence of Mr. Garstang, it becomes necessary for me to say that this report is not signed by the entire committee. We have one dissenting vote, Mr. Muhlfeld, who has a minority report that he wishes to present.

The President: The report will now be received, and we will listen to Mr. Muhlfeld's minority report.

Mr. Muhlfeld: I regret very much that the time that I have had since June 9, when I heard from Mr. Garstang in regard to the action taken by the committee as a whole, did not permit of submitting this report to the Secretary for printing and distribution. I will read the letter which I wrote Mr. Garstang immediately after I received his advice.

Mr. Wm. Garstang, Chairman Standing Committee on Cast-iron Wheels,
Master Car Builders' Association:

Dear Sir,— Complying with your telegram of June 9, 1908, the undersigned, a minority of your Standing Committee on Cast-iron Wheels, desires to state the following reasons for not having concurred in the report as submitted, to cover the work accomplished since the 1907 convention.

First — Wheel Defect and Worn Coupler Limit Gauge:

With respect to drawings W. C.— 1908-3 and W. C.— 1908-4; gauges so made will remove from service chilled cast-iron wheels having flanges more than 1 inch thick on cars of less than 80,000 pounds and more than 1 1-16 inches thick on cars of 80,000 pounds and over capacity, and which flanges are generally safe to run.

The inauguration of a practice which will unnecessarily increase the delay to traffic as well as the cost for maintenance of equipment, and at the same time reduce the average mileage or time service of 18,000,000 wheels now in service under equipment affected by the Code of Rules is inadvisable. From one to two years' service may be obtained from wheels under freight equipment cars per 1-16 inch wear on flanges which may approximate the minimum allowable thickness.

Recommendation.— Making the width of slots in the proposed modified gauge 15-16 inch and 1 inch instead of 1 inch and 1 1-16, respectively, will practically conform to the limits specified by Rule 10 of the Code now in effect and which is safe and economical.

Second — Quality of Material:

It is generally admitted that seams which produce flange failures are largely the result of service and caused by excessive heating due to rolling or sliding friction. An excess of sulphur in the wheel material will, therefore, greatly increase the liability of such seams forming at that point in the tread where the friction is the greatest and more particularly when the chill may be extremely high or low.

The continued remelting of the material in cast-iron wheels now in use with high sulphur coke and the addition of too small a proportion of new and suitable material, will aggravate the present difficulty.

As it is now the general practice of railroads to specify the chemical analysis or to at least limit the sulphur in material such as rails, axles, crank pins, tire, piston rods, boiler and fire-box plates and tubes, pipe, billets, bars, shapes, springs, rivets, wire, miscellaneous sheets, steel casting, couplers and charcoal and coke pig iron, it does not appear consistent that your committee shall continue their recommendation of a specification covering such an important item of interchange as a chilled cast-iron wheel without requiring a reasonably good mixture and placing a limit on the maximum allowable sulphur, which element it is known contributes more than any other in the analysis to broken flanges and burst wheels.

The allowable overloading of 80,000 pounds and greater capacity freight cars of from ten to twenty-five per cent above their marked capacity, as well as the relative increase in the average running speeds of freight trains and in the percentage of automatic braking power, due to the use of high pressure control, the higher rated pressure-retaining valves and the greater calculated braking pressures, necessitates some immediate and substantial action to avoid a further depreciation of the chilled cast-iron wheel, which can be made to meet the requirements of the service which it is called upon to perform.

It would appear preferable to increase the first cost for the individual wheel and its average mileage, time service and factor of safety rather than to increase the total cost for wheel renewals by the inauguration of restrictive dimensions which will reduce the average mileage and time service without increasing the factor of safety and also increase the delays to the movement and interchange of traffic.

RECOMMENDATION.—The use of at least 30 per cent of suitable charcoal pig iron and a maximum limit of 12 per cent for the sulphur content would assist in improving the quality of wheels furnished under the present specification, physical test and other requirements.

The increase in cost would be the difference in price between the charcoal iron specified and the material it will substitute, there being no extra expense for manufacture.

Third — Limit Gauges for Remounting Cast-iron Wheels, Figs. 7 and 8, M. C. B.-J.

These gauges unquestionably remove from use wheels of serviceable dimensions which have worn uniformly and results in unnecessarily reducing the average mileage or time service of chilled cast-iron wheels and in a corresponding increase in the cost of maintenance.

RECOMMENDATION.—The gauge in its present form is not sufficiently developed to be economical for use in determining upon wheels suitable or unsuitable for remounting, and the flange thickness slots should at least be revised so that flanges 1-16 inch thicker than those removed by the *wheel defect and worn coupler limit gauge* will be acceptable for remounting.

Fourth — Standard Reference Gauge for Mounting and Inspecting Wheels. Maximum and Minimum Flange Thickness Gauges, M. C. B. 12.

The specified gauging points used for inspecting wheels are not consistent with those used for mounting wheels when two wheels having the maximum allowable thickness of flange are applied to the same axle.

To make this gauge practical and suitable for the present-day methods of mounting wheels would necessitate an inside gauge of flanges which would result in guard and wing rail contact when two wheels having the maximum allowable thickness of flange and with considerably worn treads are applied to the same axle.

Recommendation.— As the ⅛ inch of metal added to the back of the flange does not strengthen the same through the points where the flange breakages generally occur, the elimination of this metal would assist in harmonizing the discrepancies in the gauge.

It would also seem advisable to increase the areas of the relatively small wearing faces of the gauging points on the *standard reference gauge for mounting and inspecting wheels* and on the *maximum and minimum flange thickness gauges.*

Fifth — Diagram Showing the Measurements for Mounted Wheels Covering Wheels Loose or Out of Gauge. W. C. 1907-6.

The specified dimension of 4 feet 5 3-32 inches and of 4 feet 6 29-64 inches will not permit of two wheels each having the maximum allowable thickness of flange being mounted on the same axle and meet the requirements of the *standard reference gauge for inspecting wheels.*

Recommendation.— Dimensions refined to fractions consisting of 1-64 and 1-32 of an inch are not practical for work such as mounting by hydraulic pressure wheels that are cast in sand and not finished on the gauging points.

Sixth — Referring to the Criticisms of Your Committee's Report to the Convention of 1907:

(a) *Chillers made the same as the profile of a 1-inch 20-taper wheel will not produce wheels of the same taper.*

Recommendation.— This is still contended due to the variation in foundry practice.

(b) *Taking wheels of nominal diameter for test purposes would not eliminate the hard iron wheels.*

This was favorably acted upon by the assembly.

(c) *Leaving out the two per cent variation clause makes no limit to the maximum weight when purchased on the pound basis.*

RECOMMENDATION.— This is still contended for the purpose of protecting the purchaser against manufacturers who might unnecessarily increase the weight.

(d) *To reduce the liability for derailment of new wheels that may come in contact with worn or sheared rail, it is advisable that the radius at the throat of the flange shall not be more than 5/8 inch.*

RECOMMENDATION.— This is still contended, more particularly in view of the American Railway Association rail-head contour, as recently adopted.

(e) *Cast-iron wheels under cars of less than 80,000 pounds capacity having flanges 1 inch thick and wheels under cars of 80,000 pounds and over capacity having flanges 1 1-16 inches thick* (as measured by the wheel defect gauge now in use) *are safe to run.*

RECOMMENDATION.— This is still contended.

(f) *The conclusions should state that the new standard shall be accepted as the minimum limit of the wheel to be used.*

This was favorably acted upon by the committee.

Seventh — RECOMMENDATION.— On account of the transverse cracking and the chipping and breaking of the outside of the rim of the Master Car Builders' standard design of wheel, it is suggested that consideration be given to the reinforcement of the same, either by a relocation of the plate or through additional metal, preferably the former.

Eighth — Section 4 of Specification for 33-inch Cast-iron Wheels states that "two representative wheels shall be taken at random."

RECOMMENDATION.— It is suggested that this be changed to read that "two representative wheels shall be selected by the inspector," in order to avoid a possible controversy between the manufacturer and the inspector.

All of which is respectfully submitted for the consideration of your committee and the members.

Yours very truly,

J. E. MUHLFELD,
Genl. Supt. Motive Power.

BALTIMORE, MD., June 13, 1908.

THE PRESIDENT: Gentlemen, the report on Cast-iron Wheels is before you.

MR. SCHROYER: I move the acceptance of the minority report, and that the same be referred to letter ballot.

(Motion seconded.)

MR. GIBBS: Does that mean shutting out the other report as a whole?

MR. SCHROYER: No, in addition to the other.

The Secretary: The only disposition we can make of the minority report is to receive it and substitute it as the original report. Mr. Schroyer's motion is out of order.

Mr. Whyte: As I understand it, it is Mr. Muhlfeld's suggestion that this be included in the interchange rules.

The Secretary: No.

Mr. Fowler: I would suggest, as Mr. Garstang is not here, that the gentleman who read the report be permitted to make a reply to Mr. Muhlfeld before any further action is taken. I want to say I would be better prepared myself to reply, but for the fact that I was laid up several months and was unable to attend the meetings of the committee. I think a great many of these disputes that come before us might be eliminated if the members of the committee would attend every meeting of the committee, and I hope some day an arrangement will be made by which they will be compelled to do so. I do not think any one is so well qualified to make a reply to Mr. Muhlfeld as Mr. Garstang's personal representative.

Mr. B. D. Lockwood: Gentlemen, I have a copy of Mr. Muhlfeld's minority report, and as you have just heard him read it, I had better refer to it according to the way it is itemized. The principal point of difference from the Wheel Committee's 1908 report, is in regard to the wheel defect and worn coupler limit gauge in the substitution of a 15-16 inch for the 1 inch and a 1 inch for the 1 1-16 inch slots, the claim being made that the present 1 inch and 1 1-16 inch slots in the gauges proposed by the committee will not condemn wheels similar to the 1904 gauge: or, in other words, that they will condemn wheels with a 1-16 inch thicker flange than is necessary. So far as this point is concerned, we have not been able to find any basis for this claim. One of the members of the Wheel Committee is associated with the Pennsylvania Railroad and I regret that he is not here to present his side of this case, since the Pennsylvania people, I understand, have been experimenting with the 15-16-inch and 1-inch slot in the new form of gauge. When the subject came before the committee the slots were of indefinite width, purposely made so, for the committee's investigation. Since 1 inch and

1 1-16 inches for condemning worn flanges has been the standard of this Association for years, and was adopted and used for a considerable time prior to this convention, and the original 1904 gauge would condemn wheels when above flange thicknesses had been reached, and we make a new gauge to take the place of it more nearly conforming to the worn wheel in the throat radius, but with the same width of slots, I fail to see why we are removing wheels with the new gauge with an excessive thickness of flange.

So far as the quality of material is concerned, Mr. Muhlfeld brought that question before the committee and in our report we distinctly say that it would be advantageous for the members of this Association to get together on this point, or at least instruct the Wheel Committee to get together with a joint formal committee of the manufacturers on same, and we understand that the manufacturers have no such formal organization at present. Such an organization among the manufacturers must be formed and their representatives must come before the committee empowered to act before any joint foundry practice and specification can result; but we recommend, if it is possible, that such be done.

In regard to the third item, regarding the limit gauges for remounting cast-iron wheels. Those gauges were submitted to the convention last year; were discussed thoroughly and defended by their originators, then submitted to letter ballot and adopted. The standard reference gauge for mounting and inspecting wheels, also the maximum and minimum flange thickness gauges, were submitted in the same way, discussed and adopted.

In regard to the statement that the specific gauging points used for inspecting wheels are not consistent with those for mounting wheels, when two wheels having the same thickness of flange are applied to the same axle, I beg to say, as the exponent of the Wheel Committee in working this up, we aimed to take care of this pretty thoroughly, but may have a variation of 1-64 inch from the true measurement in our given dimension. As regards measuring to 1-64 inch, which it is claimed is untenable when measuring rough castings, we certainly must have a defined measurement or limit when working in joint session with a committee of the American Railway Association, the members of the Wheel Committee being members of the Wheel and Rail Committee of that Association. The American Railway Association, by reason of its superiority, has limited and defined where the gauging points shall be taken in measuring track and that point happens to fall ⅝ inch below the top of the rail, and this same gauging point, when used in connection with mounted wheels, results in small fraction dimensions on the gauge. If we make such a gauge and give it to the wheel shop, they should be able to work just as close to it as any other gauge whereon the dimensions are even inches, since they work to a shoulder on the gauge and not to any defined measurement line and should not care whether the actual dimension used contains a fraction of 1-64 inch, 1-32 inch, 1 inch or a mile.

As regards the diagram showing the measurement for mounted wheels, covering wheels loose or out of gauge, it is possible that we may have a variation of 1-64 inch from the true measurement, in our given dimension, and, if necessary, the committee would gladly accept a correction; but, so far as the committee is concerned, to date we have not been shown that a correction is necessary.

In regard to the statement that the measurements given for the chill will not produce a wheel having a tread taper of 1 inch in 20 inches, I beg to say, the committee does not define what the taper on the chill shall be except as to inside profile; the balance is up to the manufacturer.

Outside of the foregoing, I have no further comments to make on the minority report of Mr. Muhlfeld except to say that the details contained therein have been fully threshed over during the past several years, the different sessions of the committee during which same were discussed having been very fully attended.

Mr. Gibbs: I would like to ask the members of the committee whether they paid any attention to the subject of chamfering the outside of the rim to relieve that part of the wheel from blows from frogs? Some years ago we introduced as an experiment, and later adopted as standard, a wheel tread of which the outer inch of the rim was chamfered 1 inch in 10, with a liberal fillet at the edge, and while we have changed this to comply with the standards of the Association, we have ample evidence that the extra chamfering on the rim has wonderfully diminished the amount of rim breakage and we receded from that design with a great deal of regret.

I would also ask the committee again whether they have given any consideration to the fact that certain manufacturers of wheels in this country have departed widely from the M. C. B. standards for taper of tread. I have had approved prints submitted from one of the largest wheel makers in the country showing a taper of as much as 1 inch in 10, and in another case, 1 inch in 15. It is supposed that the various technical associations are working to adapt the wheel and rail to one another, but I fear we are not checking up these wide deviations from the established standards, and it appears that some wheel makers, for the purpose of lessening their liability for renewals because of flange wear, are turning out wheels that will be severe on the rails. The report is silent on this subject.

In regard to Mr. Muhlfeld's very excellent report, I wish to say that I doubt the possibility of securing a mixture containing from twenty to thirty per cent of charcoal iron. If we figure what this means in the case of the twenty thousand wheels made daily, it will appear that the total output of charcoal will be inadequate, and it must be remembered that charcoal iron is, of necessity, a diminishing product, owing to the increasing depletion of the forests. Therefore, while I would like to agree with Mr. Muhlfeld, I fear the adoption of his suggestion would be a mistake, because the charcoal iron is not available. The other matter of chamfer of the rim, I strongly suggest that it be further considered by the committee. I furnished them a lot of tabular information on the subject from which I received no reply. In the meantime we are changing our wheel patterns and chills to comply with the M. C. B. standard, even though we know it is a retrograde step.

Mr. Lockwood: In reply to Mr. Gibbs I would say the only reason the committee failed to endorse the large radius at the outside of the tread was due to points raised in the American

Railway Association committee meetings in regard to detector bars on unlocking switches. It was claimed, and actual trial proved the truth of the claim, that wheels having worn flanges close to the condemning limit and having a larger radius at the outside of the tread, would permit the detector bar to be thrown while a pair of such wheels were on it, and they requested the committee particularly to confine the radius used at the outside of the tread to ⅜ of an inch.

Mr. Gibbs: I did not refer to the radius so much as to the chamfer, which is intended to relieve the rim of the severe blows which it usually receives in crossing frogs, especially worn ones.

Mr. Lockwood: Mr. Gibbs, the real trouble with it, so far as the outside of the chill is concerned, what we call the sand rim, which has the same relative taper in relation to the tread portion of the rim as it did before — that is to say, if you started from a zero line you had a taper on the sand rim. If you start from the twenty you have a coincident taper. There is no change in that. We did not understand your communication in that regard.

Mr. Jas. Buchanan: The efforts of the committee have been directed to the contour. It appears to me that we have now reached the point that in order to prove out that we have got the right lines here, we must put the material in the wheels to show it. I would not favor entering into a detailed specification as to the chemical analyses required in wheels, but we ought to say to the wheel makers that they should not exceed a maximum amount of scrap with a minimum amount of undesirable elements such as phosphorus, sulphur, etc., and then let the wheel makers figure out their mixture to get those requirements. If we specify charcoal iron, the conditions of the country will not permit of its being used. I think we are not giving the wheel makers a fair chance on this proposition.

I wish to say I had a recent conference with a number of wheel makers bearing on our own line, and they were perfectly frank to say that if we would pay the price of the wheel they could make a better wheel than they are making to-day. The first cost should not receive so much consideration, and with a very slight or reasonable increase in cost, a decided improvement can be made in the wheels we are putting under our cars to-day. It is rather unfair to attempt to go on and try wheels or other lines of construction until we have proved out that the cast-iron wheel will not do what we want it to do.

Mr. T. W. Demarest (Penna. R. R.): In connection with the question raised by Mr. Muhlfeld in reference to width of gauge, the proposed gauge was forwarded to the Wheel Committee from the Arbitration Committee. The Arbitration Committee in forwarding their communication suggested widths of opening in gauge of 15-16 of an inch and 1 inch, in order to not condemn a flange which would be thicker than under the present condemning limits in the M. C. B. rules. I have here a section through flange of a wheel from a 100,000 pounds capacity car. You will notice that the present M. C. B. gauge does not quite condemn the flange. The gauge, however, recommended by the majority report from the Wheel Committee with a 1 1-16 inch opening condemns the flange; the gauge being properly located.

Mr. Sanderson: It is a 1-inch flange.

Mr. Demarest: The Arbitration Committee, recognizing further that with the proposed design of gauge that the gauging point changes and that the flange does not wear exactly vertical, recommended the widths of opening of 15-16 of an inch for gauges for wheels under cars of 80,000 pounds capacity and under, and 1 inch for wheels under cars of over 80,000 pounds capacity. The Wheel Committee have changed those recommendations to widths of 1 inch and 1 1-16 inches, respectively, which will condemn wheels with flanges thicker than the condemning limits under the present M. C. B. rules.

Mr. Muhlfeld: Mr. Demarest brings out the point that I covered, and all that we desire is that the present rules relating to allowable wear of flanges remain as they are.

In regard to what Mr. Lockwood brought up about the committee's specification not specifying the contour of the chill, reading from the report it says "chills must have the same outside profile as shown by the M. C. B. profiles adopted in 1906."

The point that Mr. Gibbs brought out was discussed at the last committee meeting in New York, and, as Mr. Lockwood states, it was on account of the objection brought up in connection with the detector bar that the increased chamfering was not considered. We understand, however, that on some railroads these bars are being removed. In these cases there would be no objection on the part of the railroads to embody the chamfer, but I think it will be found that the detector bar can be thrown when the wheel with the desired chamfer is standing on the rail.

In regard to the mixture specified on page 3 of the report, it is my opinion that it will not require a year in which to prepare a chemical analysis, as, from the conversations I have had with various representatives of the manufacturers of cast-iron wheels, I think it is possible to bring about harmonious action on the part of the majority of wheel manufacturers. That, however, remains to be seen, as a meeting has not yet been called for that purpose.

In regard to the standard reference gauge for mounting and inspecting wheels I may state that if we mount a pair of maximum flange wheels, on the same axle to conform to the gauge, and then use that same gauge for inspecting those wheels, we will condemn them. The reason I did not take exception to that gauge last year was because I was unfortunate enough not to be here.

MR. R. F. MCKENNA: Reference is made in the report of the committee to the advisability of requiring, in our specifications, certain chemical analysis of wheels.

The efforts of the Wheel Committee, for several years past, have largely been devoted to changing contour of tread and brackets, and strengthening flange, and about all has been done that can be in that direction until further service tests are made to see the developments that will occur in connection therewith.

At a recent conference with several of the large wheel manufacturers of the country, they were quite unanimous in expressing their opinion to the effect that if more money was paid for a wheel, they could make a better wheel, and it would appear, in fairness to them and justice to the railroad companies, that they should be given this opportunity. While they are bending their efforts in that direction, it would seem that, in the meantime, we should require certain chemical analysis — that is, not specify the details of same, but establish certain maximums in the way of amount of scrap material to be used and limitations on undesirable elements, such as sulphur, in connection with the wheels — before any great effort is put forth in the direction of substituting for the cast-iron wheel, which has stood up wonderfully well with the increased service to which it has been subjected, before going to other types of wheels.

THE PRESIDENT: Any further discussion?

MR. H. L. TRIMYER (S. A. L. Ry.): I move that the report of the committee, with Mr. Muhlfeld's substitution, be received and referred to letter ballot.

THE SECRETARY: That motion is out of order. The minority report can only be accepted by substituting it for the original report.

MR. SANDERSON: I move that the matter be recommitted.

THE PRESIDENT: It is moved and seconded that the matter of the cast-iron wheels be recommitted to the committee for further consideration.

THE SECRETARY: I would like to ask Mr. Lockwood if this committee could report at the next session? The gauges should be included in the Rules of Interchange.

The Arbitration Committee referred the matter of gauges to the Cast-iron Wheel Committee and the Arbitration Committee is waiting for those gauges.

MR. LOCKWOOD: The committee has presented its gauges and is ready to stand by its recommendation so far as the chairman and myself individually are concerned. If Mr. Ettinger is in the room we would like to hear from him.

MR. WHYTE: There is a joint committee of the American Railway Master Mechanics' Association and the American Railway Engineering and Maintenance of Way Association working on that subject. The labor of this joint committee indicates that some of the things which they should consider are standards of the Master Car Builders' Association, and this gauge is one of them. It was finally decided to ask the Master Car Builders' Association to appoint a committee to work with this joint committee, because the M. C. B. standard will be under consideration. I would suggest that this question of gauging be referred either to the Committee on Cast-iron Wheels to work with the joint committee, or be referred to a separate committee when the communication is received. At the present time the opening between guard rail and track rail is not, apparently, sufficient. The thickness of the flange must be considered in considering the opening between the guard rail and the track rail.

MR. FOWLER: I will say for Mr. Whyte's information that there is at this time a standing committee of the American Railway Association to consider wheel and rail sections, and that they did consider this matter; consequently I do not think the action of the Association that Mr. Whyte refers to will be effective or accomplish anything until it has been referred to the American Railway Association.

MR. WHYTE: The committee appreciates that the present standard is wrong, but the American Railway Association refers to the M. C. B. standard and says it is the standard and should be continued. It should be the effort of this joint committee to say that some of these dimensions are wrong with the possibility of changing them.

MR. FOWLER: It should in any case go to the American Railway Association Committee on Standard Wheel and Rail Sections, and nothing will be decided until they have discussed it and decided what shall be done. This committee of the American Railway Association is made up of three of the executive members of the American Railway Association, three members of the Maintenance of Way Association, and three members of the Master Car Builders' Association. All three associations are represented on that committee, and it should be an easy matter in case of conflict for that committee to settle that question.

MR. KLEINE: From the discussion it would seem Mr. Muhlfeld desires the same form of gauge that is presented by the majority report of the Wheel Committee and the only question at issue is the size of opening for condemning the worn flange.

The present M. C. B. standard wheel defect gauge measures the thickness of the flange at a point ⅜ inch above the tread; the wheel defect gauge presented by the committee also measures the thickness of the flange at a point ⅜ inch above the tread; whereas the present gauge in the M. C. B. Rules of Interchange measures the thickness of flange at a point 3-16 inch above the tread. Inasmuch as the flange on the throat side does not wear vertically straight but on an incline away from the vertical it makes a decided difference at what point above the tread the thickness of the flange is measured. Furthermore, the throat radius to which the flange is worn seriously affects the application of the gauge to the wheel flange and tread as well as the judgment of the inspector condemning the wheel. For example, it is practically impossible to place the gauge with the 3-16 inch throat radius squarely over the flange and have the gauge bottom on the tread; if the inspector tilts the gauge toward the rim the flange is condemned before it should be; if he tilts the gauge toward the back of the flange the wheel remains in service when the flange should be condemned. With the ⅜ inch throat radius gauge (present M. C. B. standard) the radius to which the throat of the wheel is worn more nearly approximates the radius on this gauge, and while this gauge is infinitely better than the one with the 3-16 inch throat radius it can also be tilted, which would result in all flanges not being condemned alike. The proposed gauge recommended by the committee eliminates the throat radius from the gauging point and provides that the bottom of the gauge must have a full bearing on the tread and thus definitely fixes the condemning point for all worn flanges alike.

Mr. Muhlfeld contends that the proposed gauge recommended by the committee should have the opening 1 1-16 inches for condemning wheels under cars of 80,000 pounds capacity and over reduced to 1 inch, and the 1 inch opening on the gauge for condemning wheel flanges under cars of less than 80,000 pounds capacity reduced to 15-16 inch, so that the proposed gauge will condemn the same worn flange that the present gauge condemns in the Interchange Rules. By examining the portion of the worn cast-iron wheel flange herewith presented and applying the various gauges to same it will be seen that Mr. Muhlfeld's contention is borne out and that we should, therefore, reduce the openings in the gauge presented by the Wheel Committee from 1 1-16 inch and 1 inch to 1 inch and 15-16 inch, respectively.

Mr. D. F. Crawford (Penna. Lines): As Mr. Lockwood has said, the majority of the members of committee are inclined to stand to the recommendations given in the report and it hardly seems possible that the committee will get together and submit a report to this convention; and as it is necessary to include in the Rules of Interchange a suitable gauge for use with the M. C. B. standard wheels which we are all using now, I would move that the openings in the gauge referred to be changed from 1 1-16 inches to 1 inch for wheels for cars of 80,000 and 100,000 pounds capacity and be changed from 1 inch to 15-16 inch for wheels for cars of less than 80,000 pounds capacity, the other dimensions of the gauge being satisfactory.

MR. HENNESSEY: I second the motion. (Motion carried.)

THE SECRETARY: Now, gentlemen, you have disposed of the gauges so far as the Rules of Interchange are concerned. The question of recommitting the subject to the committee is ready for a vote. It was moved and seconded that the whole subject be referred back to the committee for investigation and report next year.

(Motion carried.)

THE PRESIDENT: The next is the report of the Special Committee on Journal Box and Pedestal for Passenger Cars with Journals 5 by 9 and 5½ by 10 inches. Mr. Seley is the chairman of that committee.

Mr. Seley here read the following report:

REPORT OF COMMITTEE ON PEDESTALS AND JOURNAL BOXES FOR PASSENGER CARS.

To the Members:

At the 1907 convention the Committee on Standards and Recommended Practice made the following report on the above subject:

"Your committee believes that this box and pedestal could be improved by being made nine inches in width, and suggests that it be referred to a special committee to make recommendations and propose designs."

This has special reference to the pedestal and box for 5 by 9 journal shown on M. C. B. Sheets C and E. The present outside width of the box between the pedestal fits is 8½ inches, which gives but 7½ inches inside width between walls, ½ inch less than on the freight car box of same size. This restricts convenient handling of the sponging, bearing and key, as well as giving too little room for using oil cans.

We, therefore, present for your consideration a new drawing of the 5 by 9 passenger box, revised from that shown on M. C. B. Sheet C, with dimensions changed to give 8 inches inside width between walls, preserving other essential dimensions.

The drawing presented, herewith, also includes some other revisions which your committee deems advisable.

Sheet M. C. B.—C shows the top corners of the box chamfered, no dimensions being given. This is for clearance of the equalizer, and we have increased the amount of chamfer both in length and depth to permit stronger equalizer construction.

Drawing has also had end view corrected to show bottom edge of lid opening level to agree with the other two views as well as to make the lid opening of the same shape on all the freight and passenger boxes.

We also suggest slightly increasing the clearance between the outside dust guard wall and axle, and in doing so have only decreased the depth of the box for oil 1-16 inch. The opening for the dust guard has been therefore increased a like amount to maintain the lap of dust guard on wall, thus better preventing dust getting into the box. The inner dust guard wall has been considerably modified in order to clear flanges of journal bearing, but it has been sufficiently retained to strengthen the box at the upper corners.

In offering this drawing for your approval, would respectfully suggest that if it goes to letter ballot that the various changes be voted on separately and as follows:

A. Change of width to 9 inches outside; 8 inches inside of walls.

B. Increase of chamfer of top corners to 3½ inches in depth at sides; 6 inches between inside corners at top.

C. Change of outside dust guard wall opening, using 3¾ inch radius on top with center ¼ inch above center line and 3¾ inches radius below from center line, which includes increase of dust guard slot to 9⅛ inches wide.

D. Change of inside dust guard wall opening, using a height of 4⅛ inches above center line with 2 inches radii at upper corners, 3½ inches radius below with center ¼ inch below center line.

E. Addition of recess ⅛ inch wide, ⅜ inch deep at top of dust guard opening for dust guard wedge.

F. Change of width of central lugs and location of wedge stop to conform to the 5 by 9 freight car box.

G. Change of equalizer fit on top of box from 3½ inches to 4 inches.

H. Are you in favor of increasing width of front and back flanges on boxes to 1⅞ inches for additional wearing surface against pedestal?

We also offer for approval a new drawing of pedestal for 5 by 9 boxes revised from that shown on Sheet M. C. B.—E increased in width between the jaws from 8⅝ inches to 9⅛ inches to take the box just described, also having revised the location of one of the bolt holes by which the pedestal is bolted to truck wheel pieces in accordance with the practice of some of the larger companies.

We find that many trucks are in use having width over wheel pieces not the same as called for on the drawing, so that offset of bolting flange is not much value as a standard, and as it would complicate the drawing so much to show the offset required for various widths, it is deemed not desirable to make any change in this respect. We have also increased the spacing of the bolt holes at the bottom which are used for bolting the tie bar, so as to use square-head bolts. The present spacing necessitates the use of T-head bolts, which are special and not generally as available as square-head bolts.

We also suggest removal of the bead or surface ribbing, making the outer face of the pedestal one continuous surface, of proper thickness at the bolt holes and guides and gradually rounding off to the outer edges. This modification does not sacrifice strength nor materially increase the weight, but it does improve the appearance and facilitates cleanliness. The smoother surface does not catch and retain the dirt as on present design, and is more readily wiped.

This drawing shows wearing bearing as formerly for 1-inch depth of flanges on boxes. If question H, under boxes, should carry in favor of the increase, it will be assumed to apply also on pedestal wearing face as to width.

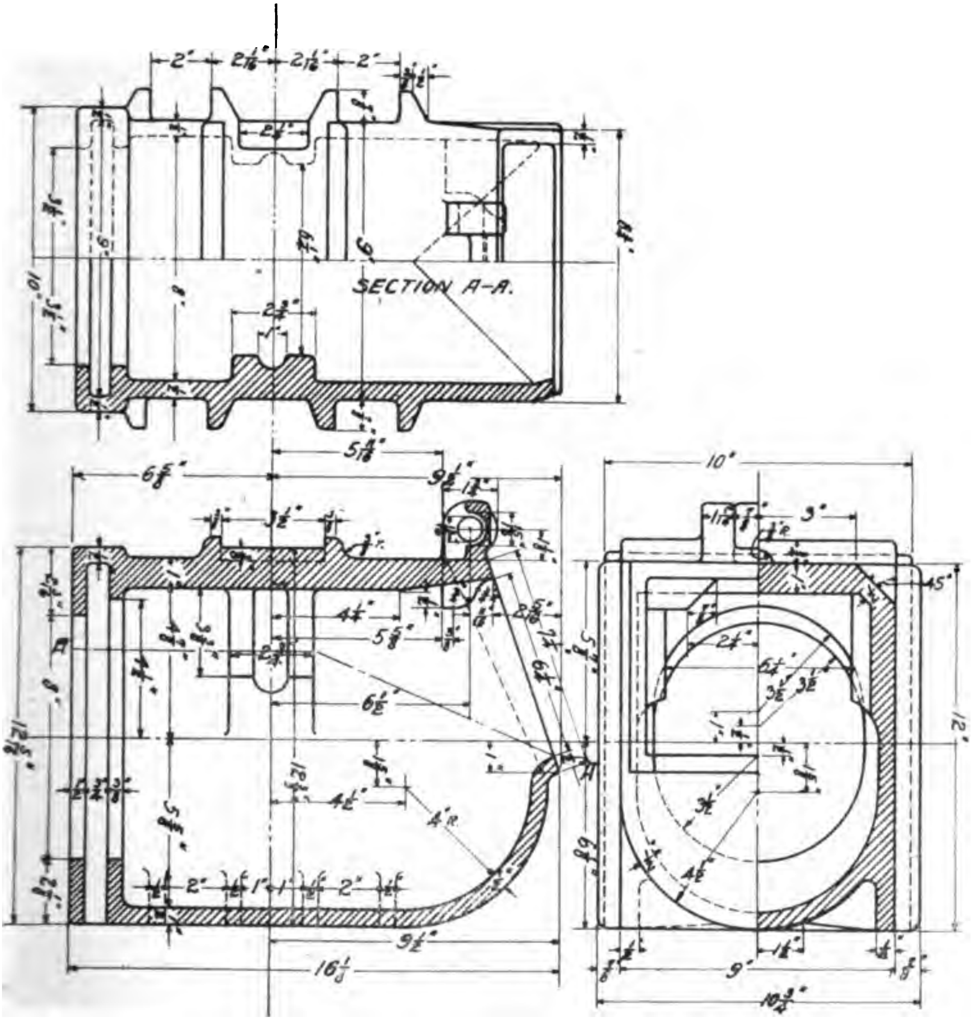
This committee was also instructed to include in its recommendations designs for journal box and pedestal for trucks using 5½ by 10 inch journals.

Your committee does not favor the use of this size journals in passenger service. They are not justified in six-wheeled trucks, and when cars are of the length and weight which would require greater axle capacity than is afforded by four with 5 by 9 inch journals, six-wheeled trucks should be used.

We find that very few roads have used 5½ by 10-inch journals in passenger service. If future development should bring about such a requirement, we are of the opinion that by that time the truck construction and material will have changed from present practice and our labor would be in vain, at least so far as the pedestals are concerned.

In order to fulfill our instructions, however, we present, herewith, drawings showing designs of 5½ by 10-inch box and pedestal modeled on the general lines of those shown in our records and which are in use on a few passenger equipment cars.

These drawings are furnished by the courtesy of the C. B. & Q. Railroad. Your committee would suggest that they be reproduced in connec-


SECTION A-A.
2"
2 1/16"
2 1/16"
2"
10"
12"
9"
10 3/4"
16 1/8"
9 1/2"
9 1/2"
6 5/8"
5 11/16"
4 1/2"
5 5/8"
6 1/2"
4"R
45°
3"
1 1/2"
2 1/4"
6 1/4"
3 1/2"
3 1/2"
3 1/2"
4 1/2"
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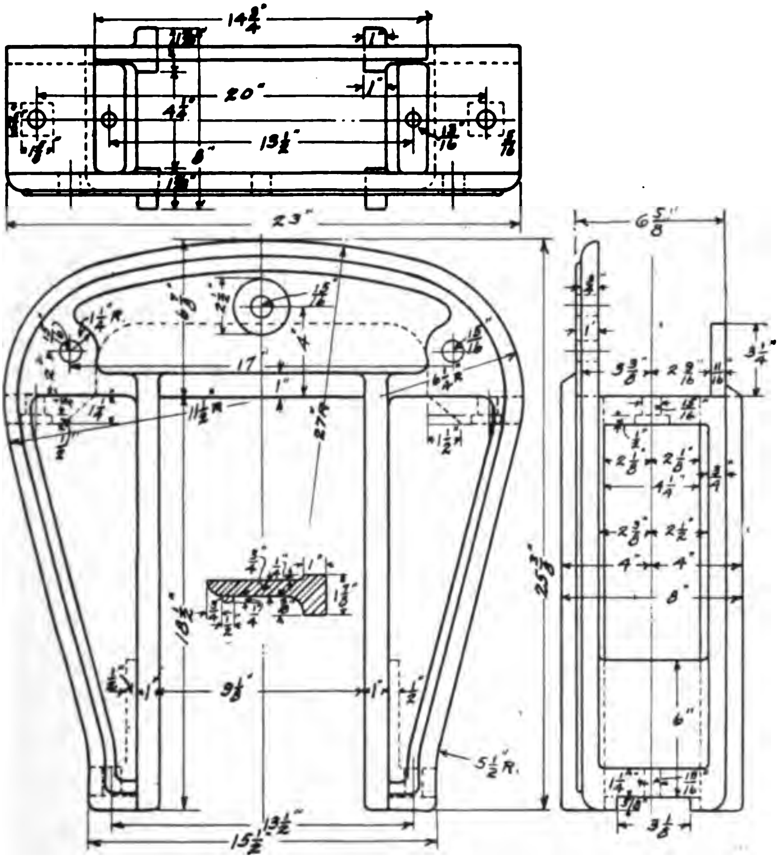
1"
1"
2"

JOURNAL BOX.



PEDESTAL

tion with this report as a matter of record and information for use at a later period if required, but not as Standards or Recommended Practice for reasons stated.

Respectfully submitted,
C. A. Seley (Chairman),
E. A. Benson,
J. J. Tatum,
Committee.

Chicago, Ill., May 25, 1908.

Mr. Brazier: I move that the report be accepted.

Mr. McKenna (D. L. & W. R. R.): This calls for 2 inches between flanges. I would like to suggest that the distance between the flanges be increased at the bottom line of the box, thereby giving a freer rolling movement to the box when the car is going from the tangent to the elevation of curves.

THE PRESIDENT: Is there any further discussion on this report on pedestal and journal boxes?

MR. CLARK: I move that the report be received and the recommendations referred to letter ballot.

Motion seconded.

MR. SELEY: The suggestion of the committee is that the 5 by 9 inch box and pedestal as shown on Sheets M. C. B. C and E be referred to letter ballot. We would prefer that the 5½ by 10 inch box and pedestal be printed in the Proceedings as a record, and not as a standard of recommended practice, but simply for information.

(Motion carried.)

THE SECRETARY: I would like to read the following notice:

To the President M. C. B. Association:

DEAR SIR,—Kindly announce to the members that the usual return sleeping-car transportation can be had by applying to A. E. Benson, Room 149, The Shelburne. Application should be made before Friday 3 P.M., June 19.

Yours truly,

E. A. BENSON,

THE PRESIDENT: The next report is that of the Special Committee on Marking of Freight Equipment Cars. Mr. R. L. Kleine is chairman of the committee.

Mr. Kleine read the report.

REPORT OF COMMITTEE ON STANDARD MARKING OF FREIGHT EQUIPMENT CARS.

To the Members:

At the last convention the Committee on Standards and Recommended Practice presented a communication from Mr. W. F. Allen, Secretary of American Railway Association, relative to recommendations from Mr. Arthur Hale, Chairman of the American Railway Clearing House, in regard to marking cars with standard initials and the suggestion that the initials and numbers should be painted in some uniform place on each car, and not too high. It was also stated that Mr. Hale had taken up the subject of standard initials for marking freight cars with the Association of Transportation and Car Accounting Officers.

The object of this suggestion is to facilitate car checking, particularly at night, the intention being to recommend a uniform location and height for the initials and numbers of cars, and with this understanding the suggestion was approved by the Committee on Standards, which offered the following additional paragraphs to the section on stenciling cars:

"The initials and numbers of all cars having a superstructure, which will permit, shall be placed about midway between the door and corner post on the left-hand side of the car, and be arranged at a height of 4 feet 9 inches from the rail to the underside of the bottom row.

"It is further recommended that the name of the railroad should also be placed on this end of the car over the initials and number, and that the space at the right-hand end of the side of the car be reserved for the marking showing capacity, dimensions, weight,.etc."

Your committee very carefully considered these recommendations, and in order to properly place the matter before the members, a short review of this subject is given below:

The marking of freight equipment cars was first brought to the attention of the Master Car Builders' Association in 1882, when it was found that about fifty-five different roads had conflicting initials. At that time Mr. Leander Garey made a motion "That the Secretary be instructed to write to all parties who have cars, the initials of which are the same, requesting them to stencil the name of the road upon some part of the car that can be readily seen by the agent."

Although most of the roads included in that list have gone out of existence as such, this resolution is still in force. (Page 595 of 1907 Proceedings, M. C. B. A.)

In 1883 it was recommended that fast freight line cars be stenciled on one side of half of car with name of freight line spelled in full and number of the car in freight line series directly underneath. The other half of the car side should be reserved for trade-mark, etc., and the name of the road owning the car, followed by the road number, if any. The ends of the car to have only the initials of the F. F. L. and number.

These suggestions were adopted by the Association, but the committee in the following year changed the specifications to some extent, eliminating the owning company's number, and placing the owning company's name directly under the line number on the same side of car with the line name, owning company's name to be in smaller letters, as shown on M. C. B. Sheet "A." The light weight was also located on this side of car, and the capacity was to appear on the other side of car side, together with any trade-marks in use by the F. F. L. The doors were not to be lettered. The ends were to show the F. F. L. initials and number with light weight.

The committee also submitted a plan for standard marking of freight cars not in F. F. L. service, substantially the same as for those cars which were in F. F. L. service; the name and number of the road appearing on the side opposite the one toward which the door slides; the end to bear the road initials, car number and light weight.

These two systems were submitted to letter ballot, and that for F. F. L. cars was passed, but that for ordinary cars was lost.

This was the first effort to standardize the marking on regular freight equipment cars.

As the result of a remark by Mr. Grieves in the 1889 convention a committee was appointed on Standard Marking for Freight Cars, and its report was read at the 1890 convention, recommending that "The half of side of car on which the door does not slide to show the name of the railroad company (spelled in full), the number of the car placed immediately below it; and when necessary, in order to get the full name of the railroad company, two lines should be used. Light weight, etc., to be placed below number of car near sill. Trade-mark, etc., to be placed on opposite side of car side, together with the capacity. Side doors to have initials and number near the top. End of car to be marked on right side, facing end of car, with the initials and number."

A further recommendation was made relating to gondola cars providing that the name of railroad company (spelled in full), be placed on side near end of car, and the number immediately below it. Light weight to be placed on side sill below number. Capacity and size of journal to be placed near opposite end.

As a result of the discussion, the committee was continued another year, to revise the report in a manner brought out in the discussion.

The following year the committee submitted a report modified in accordance with the points made on the floor of the convention, including box, stock, gondola and flat cars. In this report provision was made for the use of either name or initials of road, but in case of initials, the full name in small letters was to be placed directly beneath them, the car number was to be placed with the name or initial on the half of the side of car on which the doors do not slide, and the light weight to appear near the side sill on this half of car. The side of car on which doors do slide to bear trade-marks, marking for air brakes, M. C. B. Couplers, or any other special marking, and the capacity of car and size of journal, if so desired, near the sill. The doors on each side to bear initials and number, and the ends to be marked near the top on the right side with initial, number and light weight.

As a result of the discussion the recommendation as to marking the doors was changed to eliminate the number on the doors, and with this modification it was put to letter ballot, and lost.

This was the second attempt to standardize the location of lettering on freight cars.

In 1892 a committee was appointed to look into the marking of F. F. L. cars, and in the next convention it reported "That the second section of the Recommended Practice should be changed from 'Doors to have no marks whatever' to 'Side doors to bear the initials of the road to which the car belongs, or the name of the line in which the car is used, together with the number of the car.'" This amendment was adopted by letter ballot, and is now Recommended Practice.

In 1896 a standard location for lettering concerning Air Brake, M. C. B. Coupler, Draft Attachment, and similar information was adopted, and provision made for the location of the number and initials on the outer face of outside intermediate sill, or on the inside face of cross-tie timber in the center on cars that are ceiled over underneath. Trucks to be stenciled with size of axle, and letter "MCB" for M. C. B. axles, or if axles are not M. C. B. Standard, to bear the dimension from center to center of journal in place of M. C. B. The location of this lettering to be on end or side of bolster on diamond trucks, and on side frame in center on pedestal trucks.

Your committee had a joint conference with a committee of the Association of Transportation and Car Accounting Officers, represented by Mr. J. W. Smith, Supt. Car Service, Western Maryland Railroad, and Mr. W. E. Beecham, of the C. M. & St. P. Railway, at which time it was decided that this committee had no jurisdiction in recommending the use of standard initials for reporting purposes submitted by the Association of Transportation and Car Accounting Officers. These reporting marks are fixed symbols for each railroad, consisting of not more than three letters, which, in a large majority of cases, do not correspond with the initials of the road for which they are intended. It was also decided that the suggestions submitted by the Association of Transportation and Car Accounting Officers at this meeting to place the initials and number between parallel lines is unnecessary.

In view of the various standards of marking in use by the railroads, many of which possess points of merit, and the fact that the construction of the cars regulates to some extent the location of the marking, your committee is of the opinion that the location of the marking should not be confined within narrow limits, but a Recommended Practice governing same should allow sufficient latitude to meet conditions and at the same time confine the location so that it will facilitate the work of car checkers, conductors, scale men, inspectors, and others, whose duty it is to take information from markings on cars.

Although the work assigned to your committee was to consider the location of the initials and numbers of cars, it was found that the locations of other markings were so closely allied to those of the initials and number that they have also been included in our consideration, subject to your approval.

With this end in view, your committee submits the following recommendations for your consideration:

MARKING ON FREIGHT EQUIPMENT CARS.

1. Freight Equipment Cars that have a superstructure which will permit should be stenciled with markings on sides of car, in the following order:

Lettering (Initials or Name of Road),
Number,
Capacity,
Light Weight.

This marking is to be located as nearly over the truck as the lettering will permit, preferably to the left of center line of side of car. On box and other house cars where doors slide to the left, the above marking may be placed to the right of center line of side of car. On any other cars where the construction makes it necessary, this marking may be placed either to the right of center line of side of car, or in the center of side of car. The distance from the center line of coupler to the bottom of car number to be normally 2 feet 4½ inches, with a minimum dimension of 1 foot 10½ inches, and a maximum of 2 feet 10½ inches. The spacing of the remaining marking to be as shown on diagram.

This location will place all the information necessary for the ordinary handling of cars in yards, freight sheds and over scales, in such a position that it can be easily read, both day and night, from the ground, platform, or scale, by conductors, scale men, car checkers, inspectors, agents and any other men whose duty it is to take information from markings on cars.

By placing the light weight below the capacity, it will facilitate restenciling this information when necessary at times of reweighing. Space should be left between the light weight marking and the bottom of car side to allow for restenciling at time of reweighing, as it is impracticable to stencil over the old marks without giving time for body color paint to dry.

In order that the markings may be most effective, your committee suggests the use of 9-inch letters for the name or initials, 7-inch figures for the number, 3-inch letters and numbers for the capacity and 4-inch letters and numbers for the light weight as preferable sizes for this lettering and numbering, although the alternate sizes now given in Recommended Practice may be used if desired.

2. The ends to show the initials or name of road, car number and light weight, in the upper half of end of car. On box or other house cars having end doors, this lettering should be so located that it will not be obscured when doors are open.

The upper half of end is preferable, as the lower half is more frequently covered by dirt and grease thrown upward by the wheels of the preceding car, which would obscure the marking if placed in this half of car end, and in case it is necessary for a conductor to take any numbers while train is in motion, they can be much more readily seen from the top of car.

The initials, number and light weight on end of car are of paramount importance to scale men, as it enables them to compare the initials and number with the manifest and enter the light weight before the car reaches the scale platform, besides assisting the weigher to set the scales.

3. Flat and low sided gondola cars should show the lettering (initials or name of road), number, capacity and light weight on the side of car in the best available location offered by the construction of the car. Suggestions as to the arrangement of this lettering are shown in the diagrams. When possible, the sizes of lettering and figures should correspond with those used on other freight equipment cars. The end marking on flat cars may be omitted.

It is self-evident that no specific recommendations in regard to location of lettering on flat and low-sided gondola cars can be made, due to the limited available space upon which to place the lettering, in addition to the variation in construction, and it was thought desirable to only specify that the necessary markings should be placed upon the cars leaving the location optional, so that it can be best suited to the construction.

4. Side and end doors should be stenciled with the initials or name of road either on the outside or inside of door. If placed on the inside the stenciling should be so located that it will not be defaced by the sliding of the door.

This stenciling is considered essential to enable railroads to determine the ownership of doors which are lost off.

If the above recommendations meet with approval the present Recommended Practice relating to the "Marking of Fast Freight Line Cars" should be dropped, as the proposed arrangement covers all cars.

The Committee on Standards and Recommended Practice referred the three following suggestions, received from members in regard to changes in Standard relating to Marking of Freight Equipment Cars, to this committee for consideration, and it would report as follows:

STANDARDS FOR STENCILING CARS.

1. It is recommended to discontinue stenciling the words "air brake" on cars, since all cars must be so equipped.

Your committee approves of this, inasmuch as the Rules of Interchange provide that "All cars offered in interchange must be equipped with air brakes," and, therefore, the stenciling of air brake on the cars has become obsolete, and we would suggest that this portion of paragraph be dropped from the Standards. In regard to stenciling the make of air brake equipment on the cars, which is covered in the same paragraph in the Standards, it is suggested that this requirement may be omitted, inasmuch as the maker's name or trade-mark is cast in raised letters on the triple valve and cylinder.

2. It is recommended to omit legend "Do not nail this door," as it is not observed, and, therefore, has no practical value.

While your committee agrees with the suggestion that this is of no practical value, there is nothing in the Standards or Recommended Practice requiring stenciling of car doors "Do not nail this door," and, therefore, has no recommendations to make.

3. It is recommended to eliminate stenciling "A" and "B" end on cars, as it is unnecessary.

Your committee approves of this suggestion, inasmuch as the location of brake shaft indicates the ends of car which are equipped with one brake shaft; and the direction in which the push rod travels distinguishes the ends of the cars which are equipped with two brake shafts. Railroads should not be required to place any more stenciling on cars than is absolutely necessary, not so much from the standpoint of first cost as the expense involved in maintaining same.

Your committee would further recommend the following changes in Standards for Stenciling Cars:

First paragraph. Change to read: "That on all box cars standing more than twelve (12) feet from top of rail to eaves, the height and width at eaves be stenciled in three-inch letters on side of car, as near the bottom as convenient." The words "height and" have been inserted, as this dimension is necessary in connection with the width to determine whether such high cars come within the clearance dimensions of the roads with which they are to be interchanged.

Omit second paragraph, relating to stenciling the initials and numbers on floor or cross-tie timbers of box, stock and other roofed cars.

Originally this paragraph was included in the Standards to facilitate the work of inspection. To fully obtain this object it would be necessary to include all classes of cars, but since the recommendation is made to limit the height of marking on the sides of cars to within reading distance the stenciling of this information on sills under car is unnecessary.

Third paragraph. Change to read: "That all classes of cars have size of coupler, style of rear attachments, kind of draft gear and style of brake beams stenciled in 2 or 3-inch letters on each side of car at opposite ends, or on each end of car directly above coupler where design of car permits. Where the kind of draft gear implies the style of rear attachments, the marking for the latter may be omitted."

The wording of this paragraph has been changed to conform to present construction and draft gear added.

To summarize:

STANDARDS.

Page 579, Proceedings, 1907.

a. Paragraph 1. Change to read: "That on all box cars standing more than twelve (12) feet from top of rail to eaves, the height and width at eaves be stenciled in 3-inch letters on side of car, as near the bottom as convenient.

b. Paragraph 2. Omit: "That all box, stock and other roofed cars have the number and initials stenciled in 3-inch letters on outer face of outer floor timber between cross-tie timbers, except where cars are ceiled over underneath, in which case the stenciling shall be put on inside face of each cross-tie timber in center."

c. Paragraph 3. Change to read: "That all classes of cars have size of coupler, style of rear attachments, kind of draft gear and style of brake beams stenciled in 2 or 3-inch letters on each side of car at opposite ends, or on each end of car directly above coupler where design of car permits. Where the kind of draft gear implies the style of rear attachments, the marking for the latter may be omitted.

d. Paragraph 5. Omit "That on all cars equipped with air brakes, the words 'Air Brake,' in letters not less than 3 inches high, be stenciled on the sides or ends of the cars, and that the make of the air brake equipment be stenciled (in smaller letters if desired) over or just preceding these words, to enable inspectors to detect repairs made with wrong material."

e. Paragraph 6. Omit "In 1902 the following additions were made to prevent errors in filling out M. C. B. defect and repair cards, and to at once identify the end of car on which defects are found or repairs made."

f. . Paragraph 7. Omit "All freight equipment cars used in interchange shall be stenciled with a letter 'B' on the end of car, etc., as shown in Figs. 1 and 2, Sheet M. C. B. 24."

g. Paragraph 8. Omit "The location of the lettering to be as near the center line, etc., on other classes of cars. See Figs. 3, 4 and 5, Sheet M. C. B. 24."

RECOMMENDED PRACTICE.

h. Omit present "Recommended Practice on Marking Fast Freight Line Cars."

i. Add:

MARKING ON FREIGHT EQUIPMENT CARS.

"1. Freight Equipment Cars that have a superstructure which will permit should be stenciled with markings on sides of car, in the following order:

Lettering (Initials or Name of Road),
Number,
Capacity,
Light Weight.

"This marking is to be located as nearly over the truck as the lettering will permit, preferably to the left of center line of side of car. On box and other house cars where doors slide to the left, the above marking may be

placed to the right of center line of side of car. On any other cars where the construction makes it necessary, this marking may be placed either to the right of center line of side of car, or in the center of side of car. The distance from the center line of coupler to the bottom of car number to be normally 2 feet 4½ inches, with a minimum dimension of 1 foot 10½ inches, and a maximum of 2 feet 10½ inches. The spacing of the remaining marking to be as shown on diagram.

"2. The ends to show the initials or name of road, car number and light weight, in the upper half of end of car. On box or other house cars having end doors this lettering should be so located that it will not be obscured when doors are open.

"3. Flat and low-sided gondola cars should show the lettering (initials or name of road), number, capacity and light weight on the side of car in the best available location offered by the construction of the car. Suggestions as to the arrangement of this lettering are shown on the diagrams. When possible the sizes of lettering and figures should correspond with present Recommended Practice. The end marking on flat cars may be omitted.

"4. Side and end doors should be stenciled with the initials or name of road either on the outside or inside of door. If placed on the inside the stenciling should be so located that it will not be defaced by the sliding of the door."

Drawings showing the proposed marking are, herewith, submitted.

Your committee would also call attention to the elaborate advertising on the sides and ends of some cars and would recommend that the practice be discouraged, as it very often involves employing experts in freight repair shops to reproduce the original intricate designs when repairs to siding are necessary.

In conclusion we would suggest that the Recommended Practice for Stenciling Cars be so arranged that the Marking of the Cars and the Size of Stencils appear consecutively in the Proceedings.

Respectfully submitted,

R. L. KLEINE, Chairman,
T. H. RUSSUM,
W. O. THOMPSON,
C. B. YOUNG,
J. F. DUNN,
Committee.

ALTOONA, PA., May 21, 1908.

MR. CRAWFORD: I move that the report be received and referred to letter ballot.

(Motion seconded and carried.)

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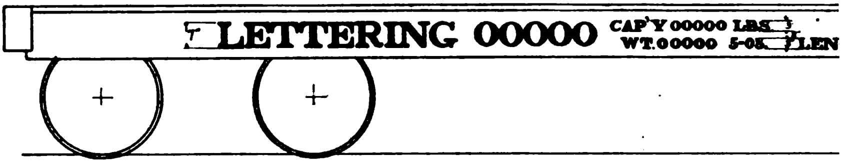
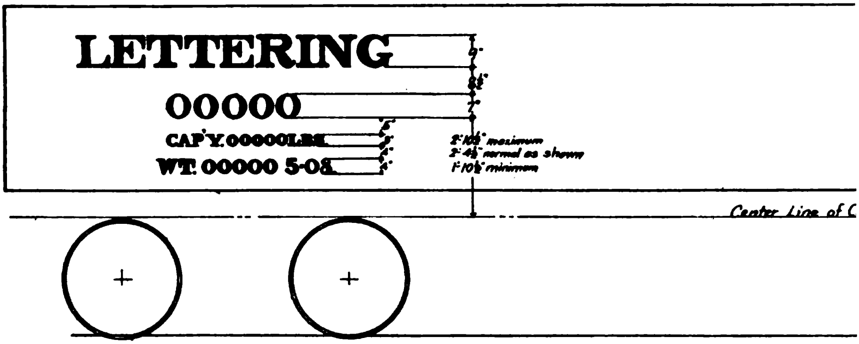
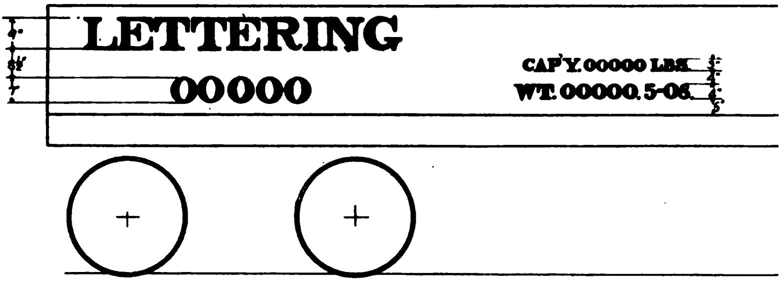






Standard

Size of coupler, style of rear attachments, kind of draft gear and style of brake beams (wood or metal) to be shown on side of car at end or on end of car above coupler.

Truck bolsters to show size of journal and letters "M.C.B" if M.C.B. axles are used, or the distance C. to C. of journals if axles are not M.C.B.

Initials of road on one side of truck bolster or truck transom.

Recommended Practice

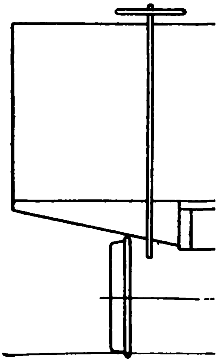
Lettering (initials or name) over truck, preferably on left side of center line of side of car.

Number under lettering.

Capacity under number.

Light weight under capacity.

Ends to show lettering, number under lettering and light weight under number, in upper half of end of car.



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W. O. THOMPSON,
C. B. YOUNG,
J. F. DUNN,
Committee.

ALTOONA, PA., May 21, 1908.

MR. CRAWFORD: I move that the report be received and referred to letter ballot.

(Motion seconded and carried.)

THE PRESIDENT: The next in order is the report of a special committee on Air-brake Hose. Mr. Parish is chairman of the committee.

Mr. Parish here read the report.

REPORT OF COMMITTEE ON AIR-BRAKE HOSE SPECIFICATIONS.

To the Members:

In 1906 your committee made recommendation that a chemical test be incorporated in the specifications for air-brake hose. It has been found, however, that this is not practicable and we therefore withdraw this recommendation.

As the wrapped air-brake hose specifications are now the standard and the woven and combination woven and wrapped specifications are recommended practice, your committee has recommended to the Committee on Standards and Recommended Practice that the specifications which are now recommended practice for woven and combination wrapped and woven air-brake hose be advanced to a standard of the Association.

The rules which go into effect September 1, 1908, require the use of standard hose, and unless the specifications for woven and combination wrapped and woven hose be advanced to a standard together with the wrapped hose, the use of this type of hose will not be permitted.

It has been brought to the attention of your committee that, on account of the damage continually done to the nipple end of hose, possibly hose built up by reinforcement or protection at the ends may prove an effective and economical proposition. While your committee has given consideration to this it is not yet in a position to make more definite recommendation than to emphasize the necessity of maintaining the present specifications another year.

Your committee, in view of this possibility, asks to be continued, that it may make further investigation of the possibilities of this question.

LE GRAND PARISH, Chairman,
J. MILLIKEN,
R. W. BURNETT,
J. A. CARNEY,
R. F. KILPATRICK,
Committee.

NEW YORK CITY, April 23, 1908.

MR. SELEY: I move that the report be received and the committee continued.

(Motion seconded and carried.)

The President: Gentlemen, what action will you take in regard to the recommendations made in this report?

Mr. Schroyer: The committee recommends that the provisions regarding the air-brake hose should go into effect on September 1, 1908. I move to change that to September 1, 1909, for the reason that there are many hose of the old patterns which are in service and some of these are still going into service, and also in view of the fact that we should not force a standard on which we have got to do a year's committee work, and in regard to which we are liable to make further changes. For that reason, I think it would be a wise act on the part of the Association to change that date to September 1, 1909, instead of September 1, 1908, more especially so in view of the fact that many hose are in service to-day and will continue in service for months to come, that have not the letters and word " M. C. B. Standard " painted thereon.

Mr. Parish: The committee does not ask for further time on the matter of specifications in general; they are established and have been for some time past. The committee believes that these standards should be put into effect as passed in the M. C. B. Rules that have been passed on by the committee and the rules adopted by the Association. Does not the point made by Mr. Schroyer, as I understand it, open up the Rules of Interchange?

Mr. Clark (C. B. & Q. Ry.): I think the reason Mr. Schroyer gives is a good one. I think it is a fact that it is only within a few days, or weeks at most, that members were advised that the committee was of the opinion that the specifications as they stand were satisfactory. It has been supposed that a chemical test would be recommended for the inner lining of the tube. I think, on the whole, that the date should be extended one year at least.

Mr. Schroyer: There is another reason why that should be done. It appears from what our purchasing agents tell us that the hose manufacturers are asking an advance in price on all hose on which that brand is applied, and some of the purchasing agents are objecting to buying hose because that advance price is put on as a result of the branding. Let us have a little more time and we can probably educate all of the roads to do this. No harm can result from postponing the date on which this shall take effect, and much good may result, as I question whether any of you are going to hold up the cars of foreign roads, simply because the air-brake hose has not that brand on it when it comes to an interchange point.

Mr. H. LaRue (C. R. I. & P. Ry.): I agree with Mr. Schroyer fully in the matter he has brought up.

Mr. F. H. Stark (Pittsburgh Coal Co.): I agree with what Mr. Schroyer has said, and I ask if the matter could not be referred to the Executive Committee with power to act and to change our Rules of Interchange to correspond with their action, hence I move that the question of the date be referred to the Executive Committee with power to act, and state that it is the consensus of opinion of this body that the date should be changed to September 1, 1909.

Mr. Schroyer: I accept the amendment.

The President: The motion is that the question of the date when the provisions of Rule 35 of the Rules of Interchange shall go into effect be referred to the Executive Committee, to decide whether it shall be September 1, 1908, or September 1, 1909.

Mr. E. A. Miller (N. Y. C. & St. L. R. R.): I think we should move slowly on putting into effect any change that will affect the interchange of cars without giving ample time for everybody to get ready for the change. We all know the complications which come up in the interchange of cars, and we should seek to avoid these as much as possible.

Mr. Hammett (Maine Cent. R. R.): As I understand, under the Rules of Interchange which were adopted this morning, this hose must be standard on all cars on September 1, 1908.

The Secretary: The object of this motion is to reconsider the action taken this morning.

Mr. Hammett: The reconsideration should be proposed, as such, and by a member of the Association who voted in the affirmative.

Mr. Seley: Is that motion out of order as it stands?

THE SECRETARY: Yes, it would be out of order.

MR. SELEY: I move that we reconsider the action taken regarding the Rules of Interchange this morning, in so far as the air-brake hose is concerned.

MR. J. MILLIKEN (P. B. & W. Ry.): The Air-brake Hose Committee has been working for several years getting up these specifications, and two years ago we reported specifications and asked that they be put in the Rules of Interchange on a certain date. Last year the date was postponed for one year, and now you are asking to postpone it for another year. Are we going to do this next year, and the year afterward?

MR. SCHROYER: Yes, we might.

MR. MILLIKEN: Had we not better put a limit on this thing and get the benefit of the rules now? Why should we delay the thing? We might as well take action on this now as next year.

THE PRESIDENT: The motion is on the reconsideration of the action of the convention this morning on the Rules of Interchange, in so far as they have reference to the air-brake hose. (The motion was adopted.)

MR. STARK: I now renew my motion that this matter of air-brake hose be referred to the Executive Committee with power to act and to change our Rules of Interchange to correspond with their action with the understanding that it is the consensus of opinion of this body that the date should be changed to September 1, 1909.

(The motion was carried.)

THE SECRETARY: The matter will be considered by the Executive Committee and the Rules of Interchange will be changed in accordance with its decision.

THE PRESIDENT: It is now twelve o'clock. Shall we go ahead with reports of committees or take up the noon-hour discussions?

MR. BRAZIER: I move that we continue our regular order of business. (Motion carried.)

MR. SELEY: I would make a motion at this time, that any topical subjects omitted by pressure of other business, be read only by abstract, and that the parties named to open the discussion be requested to send their written discussion to the Secretary for incorporation in the Proceedings.

(Motion seconded and carried.)

THE PRESIDENT: The next order of business is the report of the special committee on Automatic Connectors, of which Mr. George C. Bishop is chairman.

Mr. Bishop presented the report.

REPORT OF COMMITTEE ON AUTOMATIC CONNECTORS.

To the Members:

In order to ascertain the present status of the automatic connector, your committee has written to all the manufacturers of automatic connectors that could be found in the United States, asking for full information with reference to their connectors and all points that they thought it desirable to cover.

In the types of connectors referred to in this report, a butting connector is understood to be one in which the contact faces are in a vertical plane at right angles to the track; the side-port connector is one in which the contact faces are in a vertical plane parallel to track.

Four types were found which were perfected to a point that your committee felt they could consider them, one being of the side-port type and three of the butting type.

The collecting and registering devices are principally of two types: first, pin and funnel; and second, some form of wings or wing and tongue.

Of the connectors referred to, the side-port connector had a wing and tongue collecting and registering device, and two of the butting connectors different forms of wings, and one a pin and funnel.

Your committee has considered all these carefully and is of the opinion that the pin and funnel, or some modification thereof, seems to offer the best possibilities.

From a careful study of these designs your committee recommends the butting type of connector. That the center line of the air-brake port should be 17½ inches below the center line of the coupler. For passenger car connectors the sequence of ports from the top to be as follows: air signal, air brake and steam heat, to be located on the vertical center line of the coupler. Air-signal and air-brake ports to be spaced 3 inches centers; the center of steam-heat port 3½ inches below center of air-brake port.

There are in a few instances four ports required between passenger

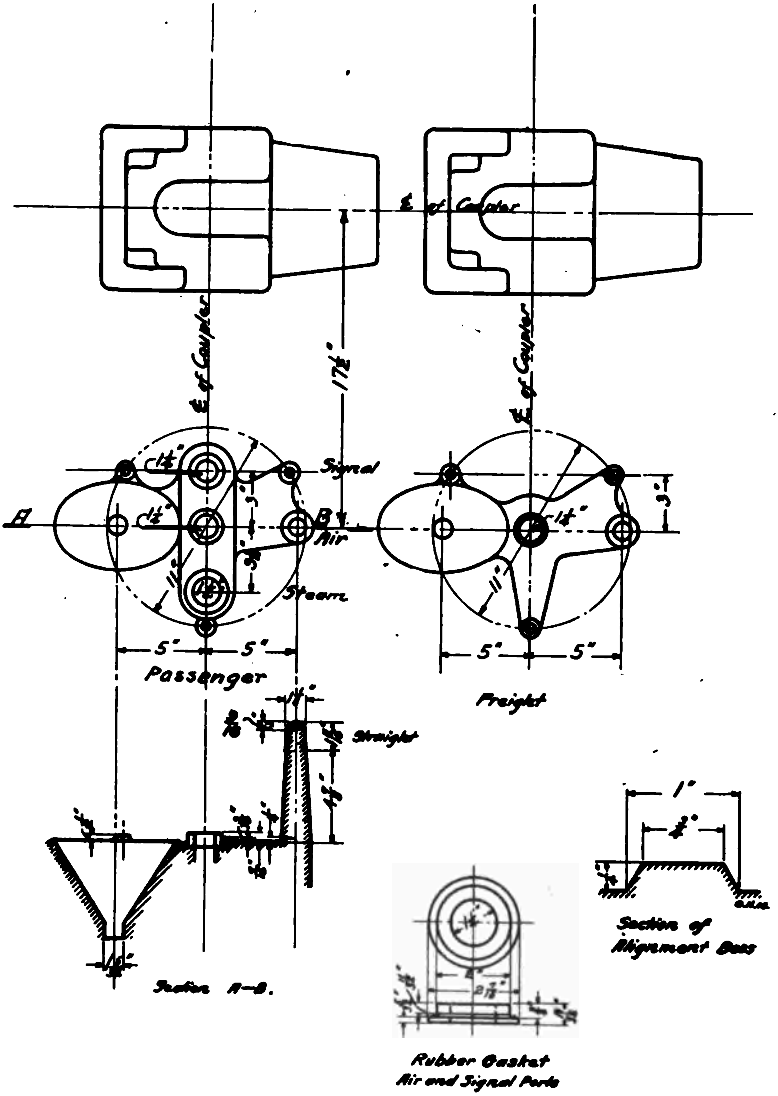

℄ of Coupler
℄ of Coupler
℄ of Coupler
17½"
Signal
A
B
Air
Steam
1¼"
1¼"
1¼"
3"
3"
11"
11"
5"
5"
5"
5"
Passenger
Freight
Straight
Section A–B.
Rubber Gasket
Air and Signal Ports
1"
Section of
Alignment Boss

PLATE A.

cars. The connector is recommended so located that a fourth port can be added above the signal port.

The air-signal and air-brake gaskets to have an opening of 1¼ inches and to be interchangeable. The steam-heat gasket to have an opening 1½ inches in diameter. The registering device to follow the pin and funnel principle. The gathering range vertically to be not less than 2½ inches above and below the center, and horizontally to be not less than 3½ inches to the right and to the left of the center.

The pin and funnel to be located on the horizontal center line of the air-brake port, the center of the pin to be located 5 inches from the center line of the connector on the right-hand side facing it, the center of the funnel 5 inches to the left of the center line. The pin to have a spherical end and to be 6 9-16 inches in length from face of connector, its outer end to be 1⅛ inches in diameter for at least 1 11-16 inches. The hole in the funnel to be 1 5-32 inches in diameter.

Three stops to be located on the face of the connector, two of these on a horizontal line 3 inches above the center of the air-brake port and on a circle of 5½ inches radius, whose center corresponds with that of the air-brake port; the bottom stop to be located on the center line of connector 5½ inches below the center line of the air-brake port.

For freight car connectors all but the air-brake port to be omitted, the relation between this port and the collecting and registering devices remaining the same. See Plate A.

While your committee has not referred the question of patents to any authority, it has been generally conceded by the manufacturers that there are no patents covering the contour recommended and this is the opinion of the committee.

There must be flexible action between the train pipes and connector somewhat in excess of the total longitudinal movement of the coupler. Of course, it is desirable to get this flexibility, if possible, without the use of hose.

Your committee, in order to give the manufacturers some basis to work on, has recommended dimensions and suggestions for a contour, but wishes to call attention to the fact that suggestions have not been developed from a service test, and therefore recommends that the Association arrange for a thorough trial of connectors on these lines.

G. C. BISHOP (Chairman),
HENRY BARTLETT,
F. M. GILBERT,
J. M. SHACKFORD,
J. F. DEVOY,
Committee.

RICHMOND HILL, N. Y., May 8, 1908.

THE PRESIDENT: Gentlemen, you have heard the report, what is your pleasure?

Mr. R. F. McKenna: I move that the report be accepted and the recommendations referred to letter ballot.

Mr. W. G. Squire: The contour suggested by your committee, as they state in the report, is that of a connector which has not been tested out in service, but it is a contour which is not covered by a patent. The two more important connector manufacturers have in the past eight or ten years been developing two specific types of automatic connectors representing the two general types of side port and butt face. There are only four designs, I understand, which are now in use or have been tried in actual service. One is of the pin and funnel type, but it has not had extensive service. One is of the side-port type of connector, which is older in the point of service of the four. There are two of the butt-face type of connectors which came before the public subsequent to the side-port type just mentioned.

The state of the art in automatic connectors, as evidenced by the records in the Patent Office, show a preponderance in favor of butt-face connectors.

It has been the experience of two of the leading connector manufacturers that the pin-and-funnel type has not, and can not, meet all the conditions of service, and this type has been abandoned by both these manufacturers, and they have had the greatest amount of experience in the development and use of connectors. There is serious objection to the pin-and-funnel type as outlined by your committee. These objections will come up more particularly and multiply rapidly only when you place in service a large number of cars equipped with connectors of the proposed type because of the fact that conditions which you can not see now are developed only by actual service, and you can not see them from a casual consideration of this contour line alone. These conditions will cause your connectors to fail and they will go to ruin in a very short space of time, more particularly when applied to freight equipment cars. The largest number of cars equipped to-day with any one design or type of coupler are possibly the thousand cars equipped with the side-port type. There are probably a couple of hundred cars equipped with the butt-faced type. Of the number of cars equipped with the pin-and-funnel type I am not advised, but they are quite limited in number.

Of the many problems met with in the connector development, that of making connections between cars is the most important, which must be taken into consideration at all times; when drawbar knuckles or horns pass each other in the act of coming together on curves, the pin-and-funnel type, the contour of which is recommended by the committee, will not meet that condition so far as my experience goes.

I have recently made an exhaustive investigation for one of the large connector manufacturers, in order to determine what would be the best means of overcoming some of the troubles that existed in their type of connector. In the course of this investigation I examined and tested in service and otherwise, some of the other types of connectors. There are certain things in all of the designs examined that do not fully meet all the conditions or requirements of service, and if we, as an Association, decide to go into this particular design, as recommended by your committee, we will have to do over again all the work which has been accomplished in the past ten years or more by the larger manufacturers, which will entail enormous expense on the railroad, as the work will be necessarily duplicated in many instances without adequate returns. The connector should be, I believe, developed by the air-brake manufacturers, as it is a vital part of the air-brake system, and with the assistance of the railroads.

Now, I do not want the Association to shut out any one, and I do not want to feel that no other manufacturers than those mentioned can come in and develop these automatic-connector devices, but it is very important for our future welfare to keep the number down to a minimum. It will mean the expenditure of great sums of money by the various railroad companies to develop these untried devices, or even to develop the recommended design and contour presented.

I am heartily in favor of the butt-face connector. From the standpoint of American practice, I believe it will make the best connection, for there is less wear to the gasket faces, less leakages, less trouble in maintenance, because the faces of the connectors coming in contact come together under compression, no side wiping and no trouble in maintaining registering devices.

I do not believe the pin and funnel can meet all the conditions which will be found in daily service on the road. I have just called attention to the fact that I believe the pin-and-funnel type can not meet all the required conditions, and I believe that honestly. I have no personal objections to the pin and funnel as a type of registration, but from the experience I have had for the last year and a half, the pin and funnel, in my opinion, can not meet rigorous conditions and demands of daily service. I do not think it can be designed so as to be strong enough; there are so many angles at which connectors are expected to connect one with another that the pin and funnel, by its own limitations, will fail to meet the requirements. This is one of the important points to be taken into consideration. You will find that the design shown will be required to meet a greater range of coupling than is possible to secure with this outline. While the projection of the pin is not much greater than the horn of either of the two types in general use — I mean in more general use than the others — this horn, when the cars come together, as I illustrate by my hand [indicating by his hands], on two cars coming in this direction (the M. C. B. couplers will pass each other), the pin will pass by the funnel and catch in the air-brake port opening and tear out the gasket or break the pin.

There are so many details connected with this matter, concerning which I believe many of our members are not at present conversant, that a serious mistake will be made if we act on this proposition hastily. I urge, therefore, that the contour be not considered at this time, but that the matter be continued further. I would say again, however, that I am greatly in favor of the recommendation of the committee as to the spacing and size of ports and all the recommendations as to location of ports, etc., in the report; but as for the contour, I will vote No.

Mr. DeVoy: There are many things referred to by the last speaker which are undoubtedly true. I have wished in the last year and a half I had discovered an expert who could have told me just what particular style to adopt. I do not think you can get in any more trouble in a week than you will if you attempt to designate what type of connector shall be used. I believe this committee attempted to steer just as clear from favoring any particular type as it was possible to do.

The work of the committee has extended over several years, and it was thought best to recommend something, and it appears after going over this matter as thoroughly as possible, that at least a contour or some other designated dimensions could be recommended for your consideration.

I do believe, after watching the matter very carefully, that the pin and funnel can be made successful. I do not know anything regarding the patent situation, but it appears to me that what your committee has submitted will more nearly meet the conditions than any other particular type. I do say one thing, that it is an absolute impossibility to get any connector manufacturer to agree to much of anything; but your committee has done about all that it is possible to do in recommending for your consideration, a contour or set of dimensions that can be followed.

MR. PRATT: I do not believe that anybody questions the honesty of this committee, and they are just as honest, probably, in their last paragraph as in any of the others. I have followed to a certain extent, this matter of automatic connectors, and I believe with the former speaker that the state of the art is still in its infancy. The committee could have reported progress, and been quite consistent with its findings and this report.

I, therefore, make a motion, as a substitute for the motion before the house, that the report of the committee be received and the size of the port openings be submitted to letter ballot, and that this committee be continued in order to carry out the suggestions in the last paragraph of their report, to make service tests and obtain from all of the railroad companies which are using the various styles of couplers the best data obtainable and report at the next convention.

MR. BRAZIER: I think we should continue the committee. The New York Central has three different kinds of connectors running, and we do not feel like recommending anything as standard. It would be useless to refer this to a letter ballot as many of our roads have not had any experience. It would be better to have the committee continued, and authorized to proceed with further tests. We have our Putnam Division Elevated trains equipped with one make of connectors, and are getting very good results. These trains are always kept together, consequently we do not have the trouble we would if the cars were allowed to run all over our system.

Mr. McIntosh: I would like very much to second Mr. Pratt's motion, if he will omit that part which referred to the submission of the matter to letter ballot. I am not satisfied that the development in the line of connectors has reached a stage where this organization will be justified in submitting to letter ballot, or of endorsing it, further than to receive a report of progress, and recommend it for further consideration by the promoters and inventors.

Mr. W. C. Squire: There are certain limitations to be considered in dealing with the connector problem. The majority of the members of this Association are probably not aware of the circumscribed and limited dimensions within which connectors must be placed to do their work, nor the extremely severe service conditions to which they are subjected. For general information, I will state that it is my belief that the practical connectors adopted by this Association will be placed directly below the M. C. B. drawbar, in order that they (the connectors) may come and go with the same; and they will not have any excess of movement between the buffing and pulling positions of the locked M. C. B. couplers. The general proposition, then, is, the connector will be placed directly below the drawbar confined within a cubical space bounded by a lateral dimension of 15 to 17 inches at right angles to the rail, with a length equal to, but not exceeding, the shank of the drawbar, and at a depth below the center line of the drawbar limited to about 22 inches, and the whole of the connector and all its movements must be held within these dimensions.

In deciding this question you must take into consideration how much the drawbars pass each other in the general movement of switching cars in yards. I believe that there is no connector made to-day that can stand up in freight service and meet all the conditions we have in our switching yards. The problem is an extensive one, very complicated and involved, and needs very careful study on the part of all the members of this Association. I believe, further, we are not ready as yet to recommend a contour, not even including any of the contours now in use. The recommendation of the committee on the size of ports, location of ports and relative position to each other and their distance below the center line of the air-brake opening and the use of the single opening in the face of the air-brake port for freight car service, is all right, and should be adopted as recommended practice, but as for the contour recommended it will be a mistake to even consider it at this time, because we are not ready for it. As Mr. Brazier has just said, it is too large and serious a question for hasty action and we are not ready at this time to consider it.

MR. G. A. HANCOCK (St. L. & S. F. Ry.): I think we should give this matter further consideration, and not adopt at the present time the contour line.

MR. CLARK: I have not had any experience with automatic connectors, but have followed the matter quite closely, and it seems to me it would be unwise for this Association to go on record as favoring any particular form of connector or contour, and especially so when the connector in question is in very limited use and probably very few members of the Association have ever seen such a connector, or had anything to do with it.

MR. PRATT: I would like to correct my motion, so as to omit referring to letter ballot any. portion of the committee's report, and would also like to correct a statement that I made in making the motion, that the child was in its infancy. I have been corrected by a neighbor who says that the child is still unborn.

MR. MCINTOSH: I second Mr. Pratt's motion, with the correction.

THE PRESIDENT: The original motion was that the report of the committee be received and that the recommendations be referred to letter ballot. Mr. Pratt amends his motion and it is now to the effect that no portion of the committee's report or recommendations be referred to letter ballot, but the committee is, as I understand it, to be continued to further investigate the matter.

The question is now on the first motion, which was that the recommendations of the committee be referred to letter ballot.

MR. PRATT: I made a substitute motion, which was seconded.

THE PRESIDENT: Then we will vote on the substitute motion, which is that none of the recommendations of the committee be referred to letter ballot, but that the committee be continued to further investigate the subject. (The motion was adopted.)

THE PRESIDENT: We will now take up the report of the special committee on Lateral Bracing of Steel Freight Cars. Mr. R. B. Kendig is the chairman of the committee and we will call upon him to present the report. The report is as follows:

REPORT OF COMMITTEE ON LATERAL BRACING OF STEEL FREIGHT CARS.

To the Members:

Your committee's work was outlined by the committee on subjects at last year's convention.

" The majority of wooden cars have no diagonal bracing in the underframing, depending on bolted joints and connections to keep the bodies square. In the case of a severe shock a wooden car will spring and give, but return to its former lines, while cars of steel or composite construction, on account of inability to spring after a severe shock, will remain sprung and bent out of line. The same committee to investigate the design of the upper framing of box cars."

A circular of inquiry issued by your committee met with response representing 40 per cent of the total number of cars represented. The information elicited shows such a marked division of opinion and practices that your committee does not feel competent to present a recommendation on lateral bracing for steel cars which would be acceptable even to a small minority of the Association.

After defining the term lateral bracing to mean either gusset bracing at the connection of bolster and longitudinal sills, or diagonal struts between the bolster and end sill, it developed that no steel underframe cars were reported without lateral bracing in one form or another. Different designs of cars require different treatment as to their lateral bracing, so that it would be impossible to design a bracing arrangement suitable for application to all classes of cars.

Concerning the upperframing of box cars, below is quoted two replies received in answer to the question as to what is considered the essential features in the design of framing of superstructure for steel box cars.

These replies are fairly representative of all the suggestions offered, either one of which has considerable merit.

"Would consider as an essential feature in the design of steel underframing the use of standard sections, angles, channels, and 'Z' bars, with as simple and direct connection to sills and plates as possible. Would tie the corner members back with metal girths to all side members extending back to door posts. Would consider the sideframing as carrying its proportion of the lading and structure, and proportion the members accordingly. Would give the end lining full bearing against endframing, which would be moderately heavy and well secured and thereby resist the shocks of shifting loads. It is well-nigh impossible to do this in wooden car construction, and one of the strongest points for steel superstructure is in the above advantage."

"A light frame steel side with riveted gusset connections at the corners and junctions of diagonal braces with posts and sills. On account of its depth this side truss can be required to carry a considerable portion of the load to the bolster, which will deliver it direct to the center plates. It is desirable to have this steel framing exposed, use no outside sheathing, but use double lining of say 1¾-inch tongue and grooved timber carriage bolted to steel frame. The ends of the car must be of fairly heavy steel construction, also made of 1¾-inch inside lining, flashing to be used at the top of the lining to insure watertight joints. Steel carlines and light steel plate roof protected from damage by boards above."

There were only four roads reported as having experience with metal upperframing for box cars, and in consequence your committee does not feel that a conclusion can be drawn from the experience obtained from these examples which would warrant it in presenting a standard design of upperframing for the consideration of the Association.

Your committee does not believe that the work delegated to it by the Association can be accomplished with any degree of satisfaction at the present time and therefore recommends its discharge.

R. B. KENDIG, Chairman,
W. F. BENTLEY,
W. F. EBERLE,
W. T. GORRELL,
F. W. DICKINSON,
Committee.

CLEVELAND, OHIO, June 4, 1908.

THE PRESIDENT: Gentlemen, what is your pleasure?

MR. SELEY: I move that the report be received and the committee discharged.

MR. MUHLFELD: Referring to the fourth paragraph of the committee's report, it says: "Different designs of cars require different treatment as to their lateral bracing, so that it would be impossible to design a bracing arrangement suitable for application to all classes of cars." That might be true in detail, but in a general way I think that can be done and specified, and it is important that it should be specified. Take, for instance, a steel underframe box car where the floor area ahead of the body bolster between the side sill and the end sill is not supported by a floor plate. In a case of that kind, it seems that with the bracing which extends from the ends of the body bolster to the ends of the center or draft sills, just behind the end sill, we get the support of this bracing to prevent the distortion of the center sill due to lateral thrust of the coupler. In the case of gondola cars, where we have the specified floor area covered by a riveted plate, it is more desirable to have the bracing extend from the junction of the body bolster and center sills to the junction of the side sills with the end sill, so as to resist the shock from cornering the cars, and also the strains imposed on such cars when they are being turned over on dumping machines at the lake ports.

Instead of discharging the committee, I would suggest that it be continued to investigate in regard to the service conditions relating to steel underframe and all steel cars and to determine if they can not find some general specification for guidance in the application of the lateral bracing, especially between the body bolster and the end sills. Different types of cars necessitate different arrangements, but we find many steel underframe cars, not only our own stock, but cars that are foreign, that show the result of rough handling, dumping, cornering and concussion, and it is important that the best character of bracing should be decided on.

(Mr. Muhlfeld's motion was put to vote and carried.)

THE PRESIDENT: We will now take up the report of the special committee on Side Bearings and Center Plates for Freight and Passenger Cars, Mr. R. D. Smith, chairman of the committee. Mr. Smith is not present, and we will ask Mr. Sanderson to present the report.

Mr. Sanderson presented the report, which was as follows:

REPORT OF COMMITTEE ON SIDE BEARINGS AND CENTER PLATES FOR FREIGHT AND PASSENGER CARS.

To the Members:

Your committee was instructed:

To review and give synopsis of reports on side bearings and center plates made to the Association in the past, since and including 1900.

To recommend a standard spread, height and clearance for side bearings for freight and passenger cars.

To investigate and report on the relations which center plates and side bearings may bear to derailments.

The first step taken by your committee was to carry out the instructions of the Executive Committee, to review the previous reports on center plates and side bearings, and a synopsis of these reports follows:

1900 CONVENTION:

That committee was to report on standard center plates, but received no instructions defining their duties or scope of investigation. It found that there was no standard center plate in use, and concluded that they might be of service by collecting data concerning the various types of center plates in service on cars under the control of members of the Master Car Builders' Association.

For this purpose, a list of eight questions was sent to the members and they were asked for their opinions.

The questions were as follows:

(1) Have you had any trouble with pressed steel center plates? If so, state fully.

(2) Have you had any trouble with malleable center plates? If so, state fully.

(3) Have you had any trouble with cast center plates? If so, state fully.

(4) Have you any record of center plates becoming ground or crushed together, so that they become fixed? If so, state how you found them and cause or results from such trouble.

(5) Do you prefer wide face for center plates? Please answer this fully, showing size preferred, with blue-prints if possible, covering defects as well as merit points.

(6) Have you any record showing results from frictionless center plates? If yes, send blue-prints.

(7) Have you any record of results from adjustable center plates? If so, please send blue-prints of same and full explanation.

(8) Do you believe a center plate can be constructed that will carry the car body vertically, excepting on curves? If any experience, please give same fully, with blue-prints.

That committee thought best to submit the answers to the Association for its consideration.

In some of the answers it was stated that the breakage of pressed steel and malleable iron center plates was due to load and light construction of plate. That committee did not think this the right explanation, but thought it due to the excessive length of the pressed-steel, malleable-iron or cast-iron center plates, and advised shortening the bearing of the center plate as much as possible, so as to reduce the bearing surface lengthwise of the bolster.

Dimensions Given for Bearings.

That committee called attention to a few conditions which can be readily followed and which give good results.

The conditions are:

Cars should be loaded evenly.

Assuming that the car is loaded evenly, that the average width is about 8 feet, that the load on one center plate is about 40,000 pounds and that 400 pounds per square inch of surface should be the general rule for center-plate service, then there will be required a center plate about 12 inches in diameter.

Allowing 2 inches for the king bolt and 1¼ inches for the inside ring, there remains about 100 square inches of bearing surface. The surface of this center plate being flat, can readily be smoothed off with an emery wheel, which would give a smooth surface upon which to support the 40,000 pounds.

That committee thought such a center plate would carry the weight of the car and maintain the vertical position required and thus relieve the side bearings of all duty except that of a safety appliance to catch the car to prevent damage from any sudden shock in a lateral direction. Some claimed the large area of such a center plate would increase friction and make it more difficult for the car to round curves; but as friction is proportional to the pressure and is independent of the areas in contact, the amount of friction on this large area would not be greater than the friction on a plate of smaller area.

The relative movement of the top and bottom center plate scarcely exceeds 3-16 inch on a 12-inch circle. Cars having marked center plates were sent over 18-degree curves and no relative movement of the center plates was observed.

It was found that in 70 per cent of the cases examined, the adjustment was made more through the agency of the axle and arch bars than through the adjustment of the center plates.

The second condition is the shape of center plate.

It is evident that a spherical surface offers the least resistance to a rolling motion. That makers of such center plates fear displacement is shown by the construction of a ring at the bottom of the circle that limits the rolling motion that they expected to receive when the ball or spherical center plate was evolved.

As long as the inner ring remains in position, reinforced by the king pin, the car retains its position upon the trucks, but a force which would cause the ring to break would also break the king bolt and cause displacement of the center plate.

Another feature in connection with spherical center plates is the listing of cars to one side bearing, and with this type of center plate there is nothing to cause the car to assume a vertical position.

The flat center plate has many advantages over the spherical center plate in maintaining the vertical position of the car, thus freeing the side bearings of all dead weight. It can be kept oiled and greased and can be made smooth with an emery wheel, thus reducing friction to a minimum.

That committee made no definite recommendations, but stated that, as the opinions received were so varied, and the answers so conflicting, it thought it best to submit the data to the Association to take such action as seemed desirable.

The report was received and the committee discharged, but its investigations led ultimately to the adoption of a flat center plate as standard.

The convention decided that the subject of side bearings and center plates should be considered together, and a committee was appointed for that purpose.

1901 CONVENTION:

The chairman of that committee on center plates and side bearings stated that, owing to press of business, the committee could not make a report and therefore asked for an extension of time. This was granted and the committee was given instructions.

1902 CONVENTION:

That committee was instructed to report on:

(1) A design of center plate with a view to adopting dimensions for standards or recommended practice.
(2) The location of side bearings.
(3) Uniform relation between center plate and side bearing.
(4) The merits of anti-friction side bearings for relieving the center plate from part of the load.
(5) Will the use of anti-friction side bearings diminish the resistance between the wheels and rails?

That committee thought that until a suitable center plate was designed, the question of the location of side bearings and their relation to the center plate should not be considered.

It obtained data on different forms of center plates and presented it to the Association. Tests on different forms of center plates and side bearings were made for the purpose of determining: (1) the best metal; (2) the best shape.

The tests were made by forcing center plates together with hydraulic pressure and turning them by means of a lever, the end of which was moved through an arc by an air cylinder. An indicator and reducing motion made it possible to determine the work done in turning the center plates under various pressures.

Tests for the purpose of determining the friction of side bearings were made in a similar manner. The tests showed that the friction or resistance varies with the degree of smoothness of the surface; also that lubrication greatly diminishes the friction and that plates of different materials, when lubricated, have practically the same resistance.

The tests did not show that flat plates were superior to spherical plates and it was found that most of the flange resistance was derived from the side bearings.

Roller side bearings gave the best results, as was the case with roller center plates. All of the tests, both on center plates and side bearings, showed the desirability of thorough lubrication.

Anti-friction Side Bearings.

The fourth and fifth subjects related to anti-friction side bearings and were as follows:

(4) The merits of anti-friction side bearings for relieving the center plates from part of the load.

(5) The use of anti-friction side bearings to diminish the resistance between the wheels and rails.

In order to determine these qualifications, that committee thought it would be necessary to conduct at some future date a series of tests extending over a period of years.

A circular was addressed to members of the Association, asking for the results of any tests which they had knowledge of.

The conclusions reached by that committee were:

(1) Design of center plate. The results of tests already made were presented, and these showed the necessity of making further tests in order to determine the minimum area of contact of center plates under definite loads, the shape of the plates and the kind of material.

Owing to the lack of time and the necessity of redesigning the machine, that committee asked to be continued another year in order to enable it to complete its work. It also called attention to the reduction in flange resistance, caused by lubricating center plates and side bearings.

(2-3) That committee had no recommendations to make concerning the relations between side bearings and center plates.

The replies received to the circular of inquiry from eighteen members showed a variation in the distance from the center of the side bearings to the center of the center plates of from 24 inches to 32½ inches. The height of the center plates varied from 2½ inches to 7 inches.

(4) Merits of anti-friction side bearings for relieving the center plate from part of the load.

The replies received from the members indicated that their opinions regarding anti-friction side bearings were about equally divided. That committee was of the opinion that with a center plate of proper design and material, and with a truck and body bolster of sufficient strength, the load could and should be carried on but one bearing point, namely, the center plate.

(5) Resistance between wheels and rails.

It was the opinion of that committee and this opinion was substantiated almost unanimously by the replies received from the members, that the use of anti-friction side bearings diminishes the resistance between the wheels and rails.

That committee called attention to the fact that, when side bearings are in contact, the pressure against the wheel flanges is greater than with center plates alone in contact.

That committee was continued and instructed to bring in a definite recommendation the following year.

1903 CONVENTION:

The committee was continued from the preceding year and was instructed to report on:

(1) A design of center plate, with a view of adopting dimensions for standards and recommended practice.
(2) The location of side bearings.
(3) Uniform relation between center plate and side bearing.
(4) The merits of anti-friction side bearings for relieving the center plate from part of the load.
(5) Will the use of anti-friction side bearings diminish the resistance between the wheels and the rails?

The principal problem before that committee was to obtain such information as would enable it to recommend to the Association a design of center plate which would generally meet the conditions. In order to determine this, the testing machine which was used the preceding year was reconstructed and a large number of tests were made.

The tests had as their object:

(1) The determination of the best metal.
(2) The determination of the best condition for the given metal.
(3) The effect of lubrication.
(4) The best shape.
(5) The comparative value of plates of special design.
(6) The determination of the best size.

In summing up the results obtained, it was found that the minimum flange resistance was obtained with a flat plate of chilled cast iron, the projected area of which was 100.14 square inches.

In order to determine the best size of this plate six different plates were constructed, the areas of which varied between 100.1 square inches and 46.8 square inches. A flat plate form with an area of 86.7 square inches gave the best general results, and it was recommended to the Association as the standard form of center plate. Two ball-bearing center plates were tested and it was reported that their use reduced flange wear.

That committee recommended to the Association that, during the following year, members equip a number of cars with ball-bearing center plates in order to ascertain more fully their durability.

Side Bearings.

A number of side bearings were also tested, but these experiments were not completed. So far as the tests were carried out, however, the results indicated very much less flange resistance with roller side bearings than with the ordinary flat plate type.

Replies from various members of the Association indicated that the distance from the center of the center plates to the center of the side bearings varied from 24 inches to 32½ inches. This distance was 25 inches in the tests which were made, but on account of the inability to thoroughly test out the side bearings, the best distance from center plate to side bearing was not determined.

That committee recommended a standard form of center plate, and stated that if ball-bearing center plates and side bearings proved to be durable in service a greatly reduced flange resistance would be obtained.

That committee was requested to furnish full contour outline of the center plate proposed, so that it could be submitted to letter ballot for adoption.

1904 CONVENTION:

The center plate shown on M. C. B. Sheet 22 was adopted as standard.

At one of the noon-hour discussions in that convention, Mr. L. H. Turner read a paper on side bearings. He called attention to the importance of reducing the friction between the wheel flange and rail, and stated that, of the wheels removed, one-half were removed on account of sharp flanges. He recommended giving side bearings sufficient clearance so that they would come in contact only when the car was rounding curves, and stated that body bolsters should be of sufficient strength to carry all the load on the center plates.

There were no reports or discussions on the subject of center plates and side bearings during the 1905, 1906 and 1907 Conventions.

At a meeting of the Executive Committee of the Master Car Builders' Association, held in Buffalo on July 15, 1907, your present committee was appointed with instructions:

To review and give synopsis of reports on side bearings and center plates, made to the Association in the past, since and including 1900.

To recommend a standard spread, height and clearance for side bearings for freight and passenger cars.

To investigate and report on the relations which center plates and side bearings may bear to derailments.

In order to obtain data on this subject, the following circular of inquiry was sent to the members.

CIRCULAR OF INQUIRY FROM THE COMMITTEE ON SIDE BEARINGS AND CENTER PLATES.

CENTER PLATES.

(1) What has been your experience with the center plate which was adopted as standard in 1903? (This center plate is shown on Sheet 22 of the M. C. B. Proceedings.)

- (a) Did this center plate become crushed or ground when used under heavy cars?
- (b) Of what material was the center plate made — cast steel, cast iron (chilled or unchilled), malleable iron, or pressed steel?
- (c) What changes in form or dimensions would you suggest? Give reasons.

(2) Is it the practice on your road to lubricate the center plates?

- (a) At time of application?
- (b) At intervals after time of application?

(3) Is there any advantage to be derived from the use of roller center plates? Give reasons.

(4) What has been your experience with roller, or anti-friction center plates?

SIDE BEARINGS.

(5) What is the standard spread, height and clearance of side bearings for passenger cars on your road?

- (a) What would you recommend adopting as standard? Give reasons.

(6) What is the standard spread, height and clearance of side bearings for freight cars on your road?

- (a) What would you recommend adopting as standard? Give reasons.

(7) Should side bearings on passenger cars be in contact? If so, what proportion of the load should they carry? Give reasons.

(8) Should side bearings on freight cars be in contact? If so, what proportion of the load should they carry? Give reasons.

(9) If side bearings were placed nearer the center plate, would the resistance to turning be increased or diminished? Give reasons.

(10) What has been your experience with roller or anti-friction side bearings?

(a) Are they durable?

(b) If not, in what manner have they failed?

(c) Does the use of roller side bearings reduce the flange wear of the car wheels?

(d) Should roller side bearings be used on freight cars as well as on passenger cars? Give reasons.

(11) What relations do center plates and side bearings bear to derailments?

(12) Describe any tests which you may have made, comparing cars equipped with the ordinary center plates or side bearings and cars equipped with roller center plates or side bearings, and give complete data as to comparative results.

Answers were received from members representing twenty different railroads and one private car line.

(1) Reports received from nine roads using extensively the M. C. B. standard center plate, indicate that it has proven fairly satisfactory, and these roads have not asked to have the standard center plate changed.

(2) Eighteen out of twenty roads report that it is their practice to lubricate center plates at the time of application. Thirteen roads report that it is their practice to lubricate center plates at intervals, and one other road recommends this practice.

(3 and 4) Two roads using anti-friction center plates report favorably of them. Six roads express the opinion that it is desirable to use anti-friction center plates, although they have had no experience with them. Four roads using anti-friction center plates report unfavorably of them. Two roads are opposed to the use of anti-friction center plates, although they have had no experience with them.

(5) The spread of the side bearings on six-wheel passenger trucks is usually about 88½ inches, and the spread of the side bearings on four-wheel passenger trucks is about 60 inches. The information received was insufficient to enable us to determine what is the prevailing practice in regard to the height of side bearings.

(6) The replies indicate that the spread of side bearings on freight cars varied between 70 inches and 48 inches, and about one-half favored adopting 60 inches as standard.

(7 and 8) In most of the letters, the opinion was expressed that side bearings on passenger cars should be in contact, but should carry no load. The members were of the opinion that there should be no contact of the side bearings on freight cars.

(9) In reply to question 9, it was the opinion of all, that the nearer the side bearings are placed to the center plate the less will be the resistance of the trucks to turning.

(10) The reports indicate that there are some types of anti-friction side bearings which give satisfaction in service and some which give much

trouble. Many of them are reported to fail on account of the rollers or balls wearing grooves in the plate, which causes the bearing to become fixed, and when in this condition it offers as much resistance as the ordinary solid type of side bearing, if not more.

Another reported cause for complaint is from the fact that on some types of side bearings the parts are liable to become lost or broken.

(11) The reports clearly indicate that it is the opinion of the majority that the relations of the center plates and side bearings to one another, their ease of operation, the efficiency of the design, the proper distribution of the load and the clearance of the side bearings, have considerable influence on the safe movement of the car.

(12) The answers to this question show that very few tests have been made for the purpose of comparing ordinary center plates and side bearings with anti-friction center plates and side bearings.

RECOMMENDATIONS.

(1) Friction should be reduced as much as possible, and as hardness and rigidity of form have a direct bearing on this, and ample strength being important, your committee recommends the use of cast steel center plates for large capacity cars and malleable iron or cast steel center plates for smaller capacity cars.

(2) Your committee believes that it is desirable to lubricate ordinary center plates and recommends that this be done at frequent intervals.

(3) Taking into consideration the information which we have received as to the durability of anti-friction center plates, your committee can not now recommend their use as the standard practice of the Association, but consider further investigation desirable.

(4) While the resistance of the trucks to turning might perhaps be reduced by placing the side bearings nearer to the center plate than is the common practice, the tendency of the car to roll would be increased.

Your committee recommends adopting as standard for passenger cars:

A spread of 88½ inches center to center of side bearings on six-wheel passenger car trucks with outside bearings.

A spread of 60 inches center to center of side bearings on four-wheel passenger car trucks.

That side bearings on passenger cars be placed just in contact but carry no load.

The various designs of trucks and bolsters in use, and the tendency to use steel construction, make it impracticable to recommend standard heights of side bearings or their height relative to the height of the center plate on passenger cars.

(5) Your committee recommends adopting as standard for freight cars:

A spread of 60 inches center to center of side bearings.

A clearance of not less than ¼ of an inch nor more than ⅜ of an inch between upper and lower side bearings when new.

The various designs of trucks, bolsters and steel underframe constructions in use make it impracticable to recommend standard heights of side bearings or their height relative to the height of the center plate.

(6) The investigations of your committee warrant them in stating that the use of anti-friction side bearings will reduce flange wear and lessen the probability of derailment.

As it is not proper to recommend as a standard any specific patented device, your committee recommends only, for passenger and heavy capacity freight cars, the use of side bearings embodying the anti-friction principle in any form that insures simplicity and durability to the greatest possible extent.

(7) In view of the importance of tests to be recommended later, your committee does not at present suggest any change in the M. C. B. standard center plate.

(8) There is evidence that derailments have in many instances resulted from the use of side bearings carrying too great a proportion of the load when used with rigid underframes, and from the binding of improperly constructed center plates and side bearings, which causes the wheel flanges to crowd and climb the rail.

The greatest practical freedom of movement of the trucks which allows of their adjusting themselves to curvature and inequality of track is believed by your committee to be of vital importance, not only because there is less probability of derailment, but also because wheel flange wear and the danger from broken wheels is diminished.

Your committee therefore calls the attention of members to the importance of this matter and recommends to the Association that an appropriation be made for the purpose of conducting further tests, not only of various forms of common center plates and side bearings, but also of different types of anti-friction center plates and side bearings. Tests should be made for the purpose of determining the best location of side bearings.

If such an appropriation is decided upon, your committee urges that tests be made of both new center plates and side bearings and such as have been in service under various conditions for a considerable length of time, and further recommends that such tests be conducted at one of the engineering universities, under the direction of a committee appointed by the Association.

Respectfully submitted,

R. D. Smith, Chairman,
R. P. C. Sanderson,
Alfred Lovell,
J. H. Manning,
Committee.

Boston, Mass., May 26, 1908.

(NOTE.—*Mr. Crawford submits a minority report, as per attached.* —SECRETARY.)

MINORITY REPORT.

To the Members:

While recognizing the desirability of fixing uniform dimensions for as many parts of cars as possible, I can not agree to subscribe to the above report, in so far as fixing the distance from center to center of side bearings at 60 inches for freight cars, when the investigation of the committee shows that freight cars are in existence having side bearings located from 48 inches center to center, to 70 inches center to center.

To definitely fix the location of side bearings would, in my opinion, require more time and investigation than the committee has had opportunity to make since the last convention. I have been unable to find that a spread of 60 inches is preferable to a spread of either 48 inches or 70 inches.

D. F. CRAWFORD.

THE PRESIDENT: Gentlemen, this report is open for discussion. I will say that Mr. D. F. Crawford, a member of the committee, has submitted a minority report. If there is no objection we will receive this report at this time.

Mr. Sanderson presented the minority report as shown at end of original report.

THE PRESIDENT: The general subject of side bearings and center plates is now open for discussion.

MR. MUHLFELD: I believe the minority report should receive consideration and I want to substantiate Mr. Crawford's contention. Referring to the paragraph marked 5, on page 10, of the committee's recommendations for adopting a standard spread of 60 inches center to center of side bearings, we do not find anything in the report which gives the reasons for such a conclusion other than paragraph marked 6 on page 9, which states that the replies received from the various inquiries indicated that the spread of side bearings on freight cars varies between 70 and 48 inches, and that about one-half of the members who replied to the circular of inquiry favored adopting 60 inches as standard.

I consider that the adoption of a standard location for side bearings affects not only the liability of cars to derail on account of the distribution of weight over the truck wheels, but also the resistance to swivelling of the truck and the interchangeability of trucks and bolsters, all of which elements are of considerable consequence in the operation and maintenance of rolling stock.

From investigations we have made to determine the cause for derailment of certain locomotive tenders and cars it has been found that by locating the body and truck bolster side bearings in relation to the center plate, so that the contact faces would come inside of the track rail gauging points, and which would make the spread between 48 and 50 inches between centers of side bearings, that when entering curves a greater proportionate amount of weight is maintained on the wheels to the leading truck in contact with the outside rails or high side of the curve than where the side bearings are located so that the point of contact is over or outside of the track rails, and the liability of derailments is thereby reduced. Furthermore, from standing tests that we have made of empty and loaded house cars of considerable rigidity and length, having a comparatively high center of gravity, it has been found that the closer the side bearings are spaced, consistent with vibration, that would tend to lift the car body from the center plate bearing, the greater will be the amount of weight on the high wheels; the ideal, but impracticable, condition being where the side bearings are eliminated and the entire load is concentrated under all conditions at the center plate.

With respect to the recommendation of not less than ¼ inch nor more than ⅜ inch clearance between the upper and lower side bearings when new, as referred to in paragraph marked 5, page 10, we believe this should be made to read more precisely, so that there will be no mistaking the minimum and maximum allowable clearance between the upper and lower side bearings on each side of the truck from the total clearance or both side bearings.

We therefore agree with the minority report, inasmuch as to definitely fix a standard location of side bearings will require more time for investigation than the committee has had opportunity to make since they have undertaken this point, and would move that the present committee be continued and that their recommendations as given in the last two paragraphs, on page 11 of the report, be approved.

Mr. Sanderson: I would like to answer Mr. Muhlfeld. I think the sentiment of the majority of the committee was that the friction was of minor importance, but the idea was that the freight cars should be carried on their center plates, and that the side bearings should come into play only as the car rolled, and that the rolling or lurching of the car was of more importance in causing derailments, on rough track, possibly, than a little more or less friction due to the difference in radius of the side bearings from the center plates, of a half inch one way or the other, and that the rolling was best taken care of by placing the side bearings as far out as safe, not to get them beyond the arch bar, and that 60 inches would enable the largest size of arch bar to be used and placed as close to the side of the car as was desirable. The Association has reappointed a committee on this subject, and has been asking them to make a report, and the majority of the committee said, " Well, if the Association wants something, let us give them the best we can do, and if it is not right we can change it, after the tests made have shown whether there is any real importance or not to this question," but as practically a majority of the cars in service are using 60 inches, or nearly 60 inches, we felt that was the best recommendation we could make, and it was up to us to make some recommendation.

Mr. Muhlfeld: I understand that, but I maintain the contention that only one-half of the railroads replying which might have reported favorably for the adoption of this as standard have done so, and that does not, in my opinion, justify the committee in making the recommendation which it has, for the reasons I have given.

Mr. Sanderson: Before the resolution which Mr. Muhlfeld has offered is voted on, I would say, that it will not be of any use to continue this committee unless the members will answer the circulars and send the information. The committee can do nothing by themselves. We gave the best report we could from the information received. The answers were few. The railroad companies did not take the pains to answer the questions. If they are going to do the same thing again there will not be the slightest use in continuing the work of the committee. I personally am willing to work, but there is no use in continuing the committees year after year, and writing to the roads for information and not receiving this, and then having the members come here and furnish information that should be furnished to the committee. The committee should have the very best information which each road has at its command before it makes its report, so that it would have the benefit of this information in framing its report.

MR. GEORGE L. FOWLER: I think the report that the committee has made is of great importance, though possibly there are a few points with regard to the effect of side bearings on wheels that have not altogether been considered. It has been my fortune, during the past year or two, to be engaged on wheel work, and I have run against the side-bearing problem very frequently. The points that I have found on some investigations are, that the less clearance you can have on side bearings the better it is for your wheels when you are rounding a curve. I found on some measurements, made with a dynamometer, that where the side bearings were practically against each other, that is those of the truck and the car, that when a car struck a curve, the pressure on the side bearings was at a minimum, whereas by increasing the distance, dropping it down as far as ⅜ inches, I got a pressure with an ordinary car loaded with 60,000 pounds of car wheels that was almost prohibitive, and prevented the truck from squaring on the tangent for some distance after it left the curve. It was an ordinary center plate. Then, in another case, where I had a car that was down on the side bearings, and rotated the truck underneath the car, I found it took four to five times as much power to turn the truck under the car on the side bearings as it did on the center plate, the center plate not being lubricated and the side bearings well greased. So with the clearance given here, without arguing against it at all, as it may be impracticable to make it less, it will be ¼ inch total, as I understand the recommendation, and it would make an excessive amount of rolling on one side of the car. In one case, where I had a car rolling just in that way, I found that it not only did not square on leaving the curve, but would remain diagonally across the track for a long distance, on a tangent, for a mile or more; and in another case, where we were down on the side bearings, and were carrying considerable weight on them (this was on an electric car where they had a guard rail inside to take the thrust of the wheel), the truck got in a diagonal position on the curve and when the car left the curve, instead of squaring and running down on the tangent as it should, it shot across to the other rail, the one leading from the outside rail, and cut a niche in it to the depth of half an inch, which gradually worked out and disappeared at a distance of 200 feet from the point of tangency, indicating that the load comes on the side bearings, and stays there and sticks, and hangs, so that if they can be given as little clearance as possible, you will get much better results in the squaring of the truck, and consequently less wear on both rails and flanges.

On electric railroads they use a shim under the side bearings of the truck. This can be removed or added to, so that the side bearings can be kept up within 1-16 of an inch of the side bearing of the body. That is giving good results, apparently, and while I have taken no measurements of the weight put on the car, this arrangement gives better results both in the motion of the car, the amount of power required to carry it around the curve and the distance which the truck will run after leaving the curve on a tangent before it squares itself.

That is an exceedingly important point, and in one case I know of where they had an epidemic of sharp flanges, the whole matter was cured completely by using an anti-friction center bearing and side plate, and keeping the bearing well up in addition. The whole thing is undoubtedly a complicated problem between the wheel and the rail and the side bearing, and the less pressure you can get on the last the easier your wheel will curve on the rail and the quicker your truck will square after it leaves the curve and gets out on a tangent.

For these reasons, I think the suggestion of the committee that the matter should be investigated further is a good one, and that careful measurement should be taken of the difference in the weights on the center plates and side bearings, and the difference in the thrust of wheels on the rails should be taken into consideration in making a design.

I can say further, on some measurements of the weight that was thrust over on side bearings, I found that with a flexible side bearing — an old spring side bearing — that the load on it was less than with the rigid side bearing, even though the yield of the flexible one might have been fully as much as the clearance on the ordinary side bearings, so that it appears to me that the closer you keep the side bearings up to the car, the less will be the weight you will put on them when the car is on the curve. With excessive clearances the car will go over with a suddenness that is startling; it goes down with a thump and blow and simply sticks and hangs and lays there, and much more heavily than if the side bearings are closer together. You get the impact of a ⅜-inch blow of the car on one side, which seems to have the effect of tilting the truck, or working on the springs in such a way that the pressure is much greater, and I have found it to increase very rapidly with the increase of the clearance of the side bearings.

Mr. Whyte: Did you experiment with the side bearings located at different distances from the center plates?

Mr. Fowler: No.

Mr. Whyte: That has as much influence on it as anything else.

Mr. Fowler: My side bearings were 56 inches between centers.

Mr. DeVoy: The remarks of the last speaker lead a person to believe that all his experiments have been made on fairly good track. What I know of derailments leads me to believe that any such clearance as suggested would not be proper. I would much rather believe that from ¼ to ⅜ inch was much better, for the reason that the play does not occur as stated, and I believe if the gentleman will refer to some of his remarks either at this convention a year ago or at a meeting of the Western Railway Club, he will find that he did state that the greater pressure was exerted on a comparatively straight track; that the rolling motion contributed a greater pressure on a comparatively straight track than it did on a curve. My observation leads me to believe that when striking a curve the pressure is not exerted instantly, but that ¼ to ⅜ inch clearance will permit the truck to regulate itself much more easily than it does with less clearance.

I know that by increasing the distance between the side bearings from about what was stated by the last speaker to ⅜ inch that it does very materially help conditions, and since we adopted that dimension there have been no derailments, so that I am not at all inclined to agree that just a little clearance is the proper thing. I would rather agree with Mr. Muhlfeld that ⅜ inch is much better.

Mr. F. W. Brazier: This report is very interesting and I am of the opinion that we should have some kind of yielding side bearing. We have had no end of trouble with broken center plates, particularly of the pressed steel design. We have quite a large number of 80,000-pounds coal cars which are equipped with malleable-iron M. C. B. center plates with a side bearing on the gravity principle. Our records show that we have had a very small percentage of wheels removed from this lot of cars with sharp flanges compared with other 80,000-pounds capacity cars with the ordinary frictionless side bearing, consequently I believe we should have all of our freight equipment equipped with some form of side bearing that will yield under load.

I am a firm believer in frequent oiling of center plates and side bearings with some good grease; in fact, our instructions are that whenever cars are jacked up and trucks taken out, the center plates and side bearings must be oiled. I believe it would be a means of saving many thousands of dollars a year in the maintaining of our equipment if we paid more attention to our side-bearing clearances and having a good material in our center plates.

Dean Goss: I suppose this question of clearance is a matter which must be determined with reference to the flexibility of the structure involved. The whole purpose of clearance is to avoid the chance of both side bearings being in contact at the same time. If we have very stiff bolsters, we do not require much clearance.

I am in favor of continuing this committee. I believe the question which they have under consideration is one of very great importance. I think that none of us appreciate how important it is until we know the effect of a given arrangement of side bearings on wear of wheels. I am hoping that the committee will not be satisfied with such information as may be gotten from correspondence with railway companies, but that they will attack this problem experimentally in a manner which will be commensurate with its importance. I trust that the motion to continue the committee will prevail.

Mr. Stark: I want to say a few words on the side-bearing question. I imagine we will have clearances to suit every man in the house. The amount of clearance depends on the construction of the bolster. As to the question of the side-bearing centers, I do not think we should go inside of 60 inches, for the reason I believe some day we will have a practical frictionless side bearing, and if we have a side bearing located further out, we will have them more nearly over the springs, where they belong, and make it possible to reduce the dead weight in the truck bolster and body bolster. While I am in doubt as to the designing of a roller center plate on account of the limited vertical space, I am quite sure a practical side bearing is within the bounds of a possibility.

Then again I would call the attention of the committee to the question of reversing the center plates. Our present standard furnishes a pocket for all the grit that falls into the plate. We lubricate them but we only add to the trouble, and I believe if we had a body bolster that was practically solid, so that directly over the bearing area of top center plate there would be no yielding, as in the case of a well-designed bolster, we might reverse the situation, but with a body bolster that is open directly over the bearing area, the effect is for the top female center plate to bulge or shove up, and let the car down on the side bearings. While a male top center plate will act as a bridge from sill to sill in the center, we could put the female center plate on the top, and then have a self-cleaning center plate. I believe the committee should consider that feature and possibly a standard could be made optional. It is not so important with closed cars, but with gondola equipment it would be preferable to reverse the situation on account of the ore, sand, etc., lodging in the bottom center plate.

Mr. Muhlfeld: Referring to the last speaker's remarks, I think that while the reversing of the center plates would clear the upper faces of grit, corrosion and adhesion due to these causes, it will also clear away any lubricating material that might be put on the bearing plates. We have had experience with female center plates located on both body bolsters and truck bolsters, and we finally adopted, from our tests and experience, the arrangement of female plate of larger area on the truck bolster, which gives us a pocket to retain the lubricating grease and material of this nature which is required to reduce train resistance.

Furthermore, in clearing wrecks (and these will occur), we find that the location of the female center plate on the truck bolster, from the standpoint of interchangeability, is a desirable feature.

In regard to 1-16-inch clearance at each side bearing as mentioned by Mr. Fowler, I do not think that is practicable, in consideration of the wear on the center plates and the deflection of the body and truck bolsters under the different loads, as it would require a large expenditure for maintenance to adhere to these limits. Furthermore, in the ordinary spiraling of a track curve, say of four or five degrees, with a considerable amount of working superelevation, there would be contact at the diagonal side bearings, where with a greater side-bearing clearance that would not occur.

Mr. G. L. Fowler: I called attention to the fact, when I first began to speak, that I hardly thought 1-16 of an inch would be practicable, merely suggesting it was desirable.

In regard to the other statement, that has been confused. I did state, I think, before the convention some time ago, that in some experiments I made I found I had an excessive load on a tangent on my center plate, but not on my side bearing. When I was doing this work I would run along sometimes for a long distance on a tangent (I had taken pains that my car should be evenly loaded) and the car was carefully balanced on the center plate when it stood in the yard. We would run along for a distance when there would be no weight, apparently, on either side bearing, except when the car would get an occasional jolt from a low joint. When we struck a curve it was evident we had a load on the side bearing, and always on the outside, of course.

MR. FORSYTH: I notice that the suggestion is that the experiments of the committee be made at one of the engineering universities, and while I am usually in favor of laboratory tests, I think this is an experiment which should be supplemented at least by service tests. While the tests at the university may give the friction of roller center plates, and of the ordinary center plates, under static conditions, they would fail to show what we want in regard to actual service conditions. This also has an important relation to the side bearings, because the test of the friction of the roller center plate would probably be made with a center load where it would be evenly distributed over all the rollers, but in service where we want to get the benefit of roller center plates, on curves and after leaving curves, we have a different condition. If the load has moved over to the outer side of the curve, and down on the side bearings, it has also transferred a large portion of the pressure from the rollers on the inside to the rollers on the opposite side, and there is a condition which I think the laboratory tests would entirely fail to take account of, and for that reason I would suggest that the tests of the committee be made not only at the laboratory but in regular service, and I would make a motion to add that to the recommendation of the committee.

PROFESSOR HIBBARD: There must be some sort of mental telephone between Mr. Forsyth's brain and my own, because he has taken the words out of my mouth that I was about to say. I want to support his motion. I feel emphatically that it would be absolutely impossible to duplicate in a laboratory the conditions under which a test of this sort should be run off. About a month ago I had the pleasure, or discomfort, of riding on top of some box cars on a high-speed freight train, and I am sure you could not duplicate the conditions that compelled me to hold on until the train finally stopped. Tests that would be carried on in a laboratory, not duplicating the conditions of road service, would be so misleading that they would be worse than useless.

DEAN GOSS: I would like to add to my previous statement. I do not feel that we should attempt to direct the committee in specifying how this work shall be done. I feel that if the matter is left to the committee they will do the best that is possible under the circumstances. I do not think that the convention should suggest the manner in which the committee should proceed, nor that the committee should indicate their plans, unless the plans are very perfectly worked out. My judgment is that this question is of such importance that it should be approached in a very broad way, and whatever may be necessary to secure accurate information, to give to the convention facts, that should be done. The laboratory may be on the railroad track anywhere, but let us get a plan of operation and proceed.

Mr. A. E. Manchester (C. M. & St. P. Ry.): It seems to me that in considering this question, the type of truck which is to be used in the test has something to do with the results which will be obtained. We have the so-called rigid truck, the lateral-motion truck, and the swing-motion truck, and I suggest whether it would not be well to have all these different types of trucks given an opportunity to show what they will do in connection with the side and center bearing test.

Mr. Geo. L. Fowler: I want to say a word in regard to the importance of taking different kinds of trucks. I have found in the work I have done that there is a great deal of difference in the type of bolster. It makes a difference whether you have a limber one or a stiff one. A limber one carries more load than a stiff one. I found that two bolsters under a car, with the same load on them, and under the same car, and of course naturally running at the same speed as the two trucks usually do when under the same car, the load on the limber bolster was very much in excess of the load on the stiff one, and the only reason I could give for it was that in yielding and running over low joints, there was a spring, and a load acquired a momentum that, by the time it was stopped, was exerting a greater pressure on the center plates, or the side bearing, than where it was held rigidly in position, and not allowed to yield, so that this matter of the type of the truck is, of course, of very great importance, and that load will vary from fifteen to fifty per cent in excess of the static load, depending upon the truck.

The President: The motion before the house is the one made by Mr. Muhlfeld that the committee be continued and that the recommendations on page 11 be approved.

Professor Hibbard: And that both service and laboratory tests be made.

The President: Mr. Muhlfeld, will you accept that amendment, that both service and laboratory tests be made?

Mr. Muhlfeld: I will.

(The motion as amended was then put to vote and carried.)

The President: The next business will be the report of the special committee on Steel Passenger Cars, Mr. A. M. Waitt, chairman. The report is as follows:

REPORT OF COMMITTEE ON STEEL PASSENGER CARS.

To the Members:

The committee appointed to report upon Steel Passenger Cars was directed by the Executive Committee of the Association to investigate that subject and advise the Association on the following five headings:

1. To consider the question generally, i. e., as to what is being done in this direction.
2. To recommend a standard sectional area for the center sills and cover plates.
3. To consider the relative merits of steel passenger cars with upper decks and those with a semi-elliptical section without an upper deck.
4. To consider the best construction of flooring.
5. To consider the relative merits of various materials for inside finish for fireproof construction.

The committee has been disappointed in receiving no replies to their inquiries from some companies which have built and used steel passenger cars, and which could have added information of value to the Association if they had been so disposed. We have, on the other hand, been greatly assisted in our work by the exceptionally full and complete information, photographs and drawings from some of the railroad and car building companies.

GENERAL HISTORY UP TO 1908.

The consideration of a change in the construction of passenger equipment cars in this country from what has been termed "wood construction" to "metal construction" has been brought more prominently before the railroad world during the last six to eight years, although the possible use of metal for such purposes was considered many years before, for we find that as early as 1854 designs of passenger cars were prepared by Mr. B. B. Lamothe, in which the superstructure was of metal but the end and sills remained of wood.

Very little progress, however, was made until about 1902, when the question of the use of metals was prominently brought forward, due to various causes, among which may be mentioned as the most important:

(a) The burning of wooden cars in wrecks, and frequent destruction of human life by fire;

(b) The splintering of the large wooden sills, etc., when cars were wrecked, causing injury and death;

(c) The scarcity of lumber suitable for sills, stringers, etc., and the threatened exhaustion of such material.

While these three conditions are the most important, there are a number of other reasons for the use of steel which may be mentioned, as, for instance:

(d) In collision with wooden freight cars the passenger equipment had some chance to escape from total destruction, but with the very large increase of steel freight cars this opportunity does not longer exist.

(e) Increased speeds, greater train length, and larger capacity of cars. Although the wooden cars have been improved by increasing the strength of parts affected, by the pulling and buffing stresses, by the use of metal platforms, the application of vestibule buffers, etc., yet these expedients are little better than makeshifts.

In 1902 the rapidly increasing use of electric motor cars caused Mr. George Westinghouse to call attention to the dangers of fire incident to the use of electric power, and to suggest the use of non-inflammable materials, especially in cars for elevated and subway service, where it would be difficult for passengers to leave the cars rapidly. The accident in the Paris subway some years ago illustrates what may happen. Brief references to electric and other motor cars is, therefore, considered essential in this report, as the construction of these cars has had an important influence in the development of steel passenger car construction, and unquestionably the knowledge and experience obtained in the building of such cars, together with the satisfactory results derived from the use of steel freight cars, has been largely responsible for what is now being accomplished with passenger equipment cars generally.

In addition to this, with the increased requirements of thickly populated districts and the rapid development of electric and other power for transportation, the average motor car has grown to such proportions that to-day it approaches closely the average steam car, and there are, even now, some cars in service which have been designed to meet the requirements of both steam and electric service.

In 1902, the Illinois Central Railroad Company and the Pressed Steel Car Company, each independent of the other, started to prepare designs embodying the use of steel in passenger cars.

ILLINOIS CENTRAL STEEL CAR.

The design prepared by the Illinois Central Railroad was utilized in the building of some composite steel cars with side doors, the first cars being ready for service during the summer of 1903. It is generally supposed that the appearance of these cars started the era of steel passenger car construction in this country.

In the underframes of these cars, 8 inch "I" beams were employed as sills, and they were securely tied together with metal end sills, bolsters and intermediates, and these were all covered with a ¼-inch floor plate, so as to make the underframes act as a unit. Truss rods were provided underneath the sills in the manner usual on wooden cars, as the steel sills themselves were not of sufficient strength to carry the lading in a car of this type, in which side doors were used, and hence no strength obtained from the side above the floor. The posts and carlines were also made of steel.

PRESSED STEEL CAR COMPANY'S DESIGN.

The design prepared by the Pressed Steel Car Company embodied the use of steel in the underframe and trucks only, as it was thought that a gradual introduction of steel would meet with more favor than a radical change. This design was submitted to several railroad officers, but while some thought that steel would eventually have to be used and the constructions were in the right direction, others thought it was too far advanced for present requirements; and, again, others thought it did not go far enough and that, when a change was made, the upperframing as well as the underframe should be made of steel. The result of the various opinions was that no cars were built.

In 1903, the Pressed Steel Car Company built for the Northwestern Elevated, of Chicago, thirty-five pressed steel underframes for elevated service. The superstructure of these cars was built by the St. Louis Car Company, and was of wood. These underframes were constructed of two inverted pressed steel fish-belly-shaped side sills, 17 inches deep at the center and 10 inches deep over the bolsters. The balance of the underframes being made out of pressed parts and rolled shapes, no truss rods were used, as the side sills were of sufficient strength to carry the lading. The inverting of the sills made them invisible from the outside, and the appearance of the cars was the same as the ordinary wooden car. These cars are giving very good satisfaction in service.

THE INTERBOROUGH ALL-STEEL CAR.

In the early part of 1904, the Interborough Rapid Transit Company, of New York, contemplated the use of steel in the construction of their new passenger car equipment. A sample car was built at Altoona, Pa., and, although not intended for steam railway service, it marked another step in metal construction. This sample car was naturally an experiment and had some minor faults which experience later corrected, and shortly afterward, during the year 1904, some three hundred steel cars were built by the American Car & Foundry Company, at Berwick, Pennsylvania, and placed in service on the Interborough lines.

These cars are 12 feet high to top of roof, 8 feet wide and 41 feet and ½ inch long over posts, and are of the so-called interchangeable type, being capable of running either on subway or elevated lines. On account of the low roof of a subway it was necessary to use a minimum height of floor from rail, which necessitated comparatively shallow sills. It was therefore decided to utilize the sides to carry the load. The sides were made in the shape of girders of ⅛-inch steel plate, with special bulb angles serving as belt rails, forming the upper flange, while other angles comprised the lower flange.

With the exception of about seven hundred pounds of fireproofed wood and other fireproof material used in the construction, the floor, which is laid with Monolith cement, and outside roof, which is of Composite board, the cars are built entirely of metal.

REPORT OF MASTER CAR BUILDERS' ASSOCIATION.

In 1904, Mr. Wiliam Forsyth read a paper before the Master Car Builders' Convention, held at Saratoga, in which paper the advantages of the use of steel in the construction of passenger cars were explained to some length, the report being accompanied by drawings showing a number of details and general plans of several steel passenger cars, among which were included some of those mentioned above.

ERIE RAILROAD STEEL CARS.

(Plate A.)

Probably the first example of a so-called *all steel* car is found in the baggage car which was built for the Erie Railroad, and was placed in service some time in 1904. This car was constructed by the Standard Steel Car Company, which also built a postal and express car for the same road; the postal car being exhibited at the International Railway Congress in Washington, D. C., in May, 1905. Shortly after this time, two mail cars were built for the New York, New Haven & Hartford R. R. Co., and have been running continuously between New York and Boston.

The body of the baggage car is constructed of angle-iron framework, and the outside sheeting is made of 3-16-inch steel plate, while the roof covering and upper deck are of ⅛-inch plate. Fish-belly box girders form the center sills of the underframe, and extending outward from this are cross bearers for supporting the sides of the car. A false floor is provided and hair felt is used for insulation.

The baggage car, No. 599, when built was lined with vitrified wood, but it was thought that with a steel car there should be nothing about it that would cause any liability of damage by fire. Wooden lining was then removed and car was operated for some time without any lining, but continual complaints were received that car was too warm in summer, account of the heat from the steel plates, and too cold in winter. A lining of composite board manufactured by the Composite Board Company of Niagara Falls, N. Y., was tested and found to be practically fireproof and was applied to the car, since which time no complaints have been received and service of the car is satisfactory in every respect.

The other two steel cars being operated on this road are also lined with composite board and are equally satisfactory.

When car No. 599 was used as a baggage car the composite board lining was protected by half-round steel strips to avoid damage from the baggage.

NEW YORK CENTRAL MOTOR CAR.

(Plate B.)

At the convention of the Master Car Builders' Association at Atlantic City, in 1906, the American Car & Foundry Company exhibited a sample all-steel motor car, being one of a lot which they were building for the New York Central & Hudson River Railroad Company.

This car was designed for service over surface tracks within the New York Central Electric Zone, and for operation in trains by the multiple unit system. The general dimensions of these cars — the order for which has since been completed — are such as to compare favorably with those of equipment for steam service, the cars being 60 feet long over buffers; 13 feet, 9½ inches high from top of rail, and 9 feet, 8¼ inches wide. The total weight in running order, including motors and electrical equipment, is 105,500 pounds. The cars are equipped with wide vestibules, and have toilet facilities similar to steam cars.

The steel construction consists of two plate girders forming the sides of the car below the window sills. These girders are of sufficient strength to carry the whole load of the car body, including the underframe and the superimposed load, and are supported by the bolsters, through which the loads are transferred to the center plate. The center sills consist of two 8 inch, 18 pound "I" beams, continuous from buffer to buffer and bent outward near the ends of the car to accommodate the draft gear, which is of the radial type. As the side girders are of sufficient strength to carry the load, the strains on the center sills are only those due to the buffing and pulling stresses. The floor is "Acandolith," laid on corrugated steel, and the interior finish of the cars is largely made of drawn steel mouldings and specially rolled or pressed steel plates.

SOUTHERN RAILWAY CAR.

(Plate C.)

At the same Master Car Builders' Convention, at Atlantic City in 1906, what may be called a "composite passenger coach" was exhibited by the Pressed Steel Car Company, as representing one of a lot of three cars which were being built for the Southern Railway. These cars, while not altogether of steel, marked another important step in the development of the use of steel in passenger cars. The underframing, upperframing, and the outside sheathing below the window sills were all of steel, the only woodwork used being the interior finish, doors, windows and some filling blocks in the framing, for the attachment of same, and also the floor, roof covering and siding above the window sills and the wood used in the trucks; the trucks being of the railway company's standard type in order to interchange with wooden cars.

The steel construction is of the type in which the center sills and the sides both carry part of the load, as distinct from types in which the center sills alone carry the load, or where the sides alone carry the load. The center sills on the Southern cars are of the fish-belly type, composed of plates and angles 22 inches deep at the center and 13⅛ inches deep over the bolsters, and extending the entire length of the car. The side plates are of 3-10-inch steel, 3 feet deep, and extend throughout the length of the body from platform to platform. The side girders and center sills are securely tied together with bolsters, diaphragms and end sills, all of steel, and all the posts, braces, and carlines are of steel. The bolsters are of double plates, consisting of 7-16-inch plates and angles, 13⅛ inches deep near the center, tapering toward the sides and reinforced with cover plates top and bottom. Between the bolsters are two deep cantilevers symmetrically spaced with reference to the bolsters. The diaphragms are made of 7-inch rolled channels, and are distributed so as to give uniform support to the floor.

This construction transfers a large portion of the superimposed load from the sides of the car to the center sills, and through the center sills to the center plates; while a certain other portion is transferred from the sides of the car to the center plates through the bolsters. The vertical lines of rivets on the exterior, connecting the side sheets and posts, are covered with steel mouldings in order to avoid the appearance of a steel car, and to give the wooden panel effect.

The dimensions of these cars are as follows:

Length over end sills	66 feet.
Width over sides	9 feet, 10¼ inches.
Height from top of rail to top of roof	14 feet, 2 inches.
Seating capacity	72 persons.
Weight of body	74,000 pounds.
Weight of trucks	36,000 pounds.

The cars are equipped with wide vestibules, two saloons, steam heat and Pintsch light.

If these cars were equipped with modern four-wheel steel trucks, which weigh about 25,000 pounds, for bodies of this type, the total weight of this car would be 99,000 pounds.

While these cars are not fireproof, yet all large timbers used in wooden car construction have been eliminated; therefore the material which would splinter in collisions is very much less, while the cars are, at the same time, very much stronger than the standard wooden cars of the same type; and, furthermore, their weight is less than two per cent greater than the weight of the Southern Railway Company's standard wooden coaches of the same dimensions.

The Southern Railway Company reports on these cars as follows:

"With regard to the three steel coaches built for this Company about two years ago, beg to advise that nothing has developed to indicate any mistake in the design or application. The cars have been in constant service since coming on our line and have had practically no repairs made on them. There has been no trouble due to the differences in shrinkage or the parts getting loose, and we are very well pleased with the construction.

"I do not believe that one passenger in a hundred riding on our trains can tell when they are riding in the steel cars, as they are free from any unusual noise."

PENNSYLVANIA RAILROAD SAMPLE CAR.

In the month of June, 1906, the Pennsylvania Railroad Company turned out of its Altoona shop a passenger coach of the all-steel form, but in which there was a considerable amount of composite board, that on the roof being covered with copper. From experience obtained with this sample car it was considered advisable, for future cars, to extend the use of steel so as to include the roof, doors, and perhaps some other parts, and further to make a change in the length of the car. The sample car had a length of 56 feet 6 inches, and in place of this it was decided to design two types of coaches of different length, to wit: a coach of larger capacity and capable of rather severe end shocks and abuse, for trunk line service; and second, a car which would be operated in comparatively short trains for suburban service and which could be equipped with electric motors should they be later desired.

Accordingly, designs were prepared by the railroad company for a coach 70 feet long, seating 88 passengers, and another coach 54 feet long for 72 passengers. Designs for postal, baggage and dining cars of the same general dimensions were also prepared, but it was considered by the railroad company that a car of 60-foot length, having a capacity of 40,000 pounds, would be sufficient for baggage, since in baggage and express service the load rarely reaches the capacity of the car, and the classification fixes the number of cars per train, rather than the weight to be transported. This capacity of the baggage car also falls within that which can be carried on four-wheel trucks.

PENNSYLVANIA RAILROAD COMPANY 70-FOOT STEEL COACH.

(Plate D.)

The 70-foot coaches referred to above, and which have been made standard by the Pennsylvania Railroad Company for heavy trunk line service, are built of steel, with the following exceptions: The head linings are of composite board, or indestructible fiber, and the seat arms and window sash are of wood. The floor is composed of Monolith cement laid on corrugated iron. Beneath the floor proper a false floor is provided, made of asbestos board; the intervening air space being intended for insulating purposes, but on each side of the car this space serves as a duct in connection with the heating and ventilating system.

The underframe construction consists of two 18-inch, 42-pound channels, with ½-inch thick cover plates top and bottom. The sills extend continuously from one platform sill to the other. By means of cantilever arms, between the trucks and the end sills, the load from the sides of the car is transferred to the center sills, then through the center sills to the trucks. In this way the sides of the car serve as trusses merely between the latter points of support, it being thought that with the necessarily narrow flanges the sides of the car can not be depended upon to act as girders to any considerable extent; further, with this symmetrical support of the sides with respect to the trucks, should there be any deflection, it will be uniform throughout the length; and further, with the comparatively low stresses in material in the sides of the car assumed in the calculation, the tendency will be to avoid any distortions in the side sheets; and, further, when desirable, side doors may be applied. The upper deck construction consists of pressed steel carlines joined to the side posts, and has been made very stiff to reduce the danger from collapsing in case of overturning of the cars.

By the use of deep center sills, which extend out to the platform sills to their full depth, it became necessary to make a new design of truck, and this opportunity was employed to design trucks of all-steel which are said to weigh some 2,800 pounds less than the standard wooden trucks of the same capacity.

The riding qualities of these new cars are said to be very good, and there is no objectionable metallic noise.

It is stated that the question of heating these cars has not been definitely decided, but it has been found that some increase in the amount of heating surface will have to be provided over that required for wooden cars of the same capacity.

As stated before, in the designing of the baggage, postal and dining cars, the same principles have been carried out, and a unit system is being followed, so that in order to change the length of the car this may be accomplished by changing the number of panels and making necessary changes in thickness of cover plates of the center sills; and, further, for simplicity in repair work, the same columns and other members of the framing, as well as the same type of drawn mouldings, for finish, etc., are employed in the different cars. Preference is given to pressed shapes over rolled sections when a saving in material can be effected by so doing. Table No. 3 shows the number of cars of this type in use or under construction.

HARRIMAN LINES — SOUTHERN PACIFIC SHOPS.

(Plate E.)

The first Harriman Lines steel car constructed was passenger coach No. 1806, turned out of the Southern Pacific shops during 1906. The dimensions of this car are as follows:

Length over end sills..................	59 feet, 10 inches.
Height from rail to top of roof........	13 feet, 8¼ inches.
Seating capacity	70 passengers.

In the underframing, two 12-inch "I" beams, 31½ pounds per foot, are used for center sills, they being continuous over the platforms. These center sills are reinforced with 1½-inch truss rods. The body bolsters are of the double cast-steel pattern, which, together with the steel platform, are intended to give strong end constructions. The sides of the car serve as girders supported by the body bolsters. The bottom flanges of the girders are made of 3½ by 7 by ½-inch angles, and the top flanges at eave line consist of 4 by 4 by ⅜-inch angles. The posts and carlines are also made of angles, and the posts between the windows are of the double pattern. At the height of the window sill, 3¼ by 2 by ¼-inch angles are framed in between the posts. The sides of the car below the windows are covered with 5-32-inch steel plates riveted to the posts, and between the windows, and above, extending over the roof, ⅛-inch plate is used. The interior finish is in general of steel and transite, or asbestos board. The floor is composed of ⅜-inch linoleum laid on Monolith cement. Ventilation is secured by means of 8-inch Cottier ventilators placed on each side of the roof, and fresh air is taken in at the floor.

Some slight change is being made in the plans of the car with the end vestibules, whereby unnecessary weight will be eliminated, and in making this change the floor construction shown in the illustration will be employed. Drawings are also being prepared for a 60-foot steel chair car similar to the coach.

The other all-steel cars of the Harriman equipment are very similar to the above, except the latest Union Pacific coach, built at the Omaha shops, in which the motor car construction has been followed to some extent. This car had also an elliptical roof, with the upper deck omitted, and is believed to be the first all-steel car in this country with this type of roof. A further description of this car is given below:

HARRIMAN LINES — UNION PACIFIC CAR.

(Plate F.)

On the Union Pacific Line of the Harriman System, the steel passenger car development has partly been attained through the experience with motor cars, and the new equipment presents some interesting features.

The latest Union Pacific coach, built at the Omaha shops, has 24-inch diameter circular windows and central side doors. The construction of the side is intended to carry the load so that the center sills, which are made of 12-inch "I" beams, are intended chiefly for taking the pulling and buffing stresses and carry comparatively no load. The circular window sash are similar to a steamship port-hole, hinged at the top so that they swing inward and upward toward the ceiling, and are made of aluminum. The interior partitions and inside walls are ¼-inch thick, and the ceiling ⅛-inch thick, which, together with the mouldings, etc., are of the same fireproof composition as the floor. There is said to be not over 200 pounds of wood in the car.

The ends of the car are rounded off in order to reduce wind resistance, and the vestibules are omitted for the purpose of making a stiffer end construction. The builders lay stress on this end design, believing that with the cast, or structural, steel bolsters used, and the round end construction in connection with the general tubular construction of the entire cross section of the car, that such a car is especially safe against buckling in collisions, and with the side construction employed to carry the load, that the car is also safer than some other designs in resisting "side swipes" and damage when rolled over.

All of the designs of the Harriman Lines generally call for the use of standard structural shapes, and the different cars, although for four-wheel trucks, are pronounced remarkably easy riding and the interiors comfortable.

LONG ISLAND RAILROAD CAR.

(Plate G.)

The American Car & Foundry Company constructed a steel coach during 1906, for the Long Island Railroad Company. This coach is 58 feet 6 inches long over body; and, with the exception of a small amount of wood for holding the interior finish, it is practically fireproof throughout.

The underframe consists of 6 by 6 inch angles forming the lower part of the side girders and acting as side sills. The center sills are 10-inch "I" beams spaced 16-inch centers. Equally spaced between the bolsters are three cross bearers, which, together with the bolsters and end sills, support the sides of the car. The sides are made of 3-16-inch web plates up to the height of the window sills, at which point, on the outside, is a specially rolled bulb angle, and a 7-16 by 3-inch bar on the inside forms the upper flange of the girder and the belt rail of the car.

The bolsters are of the double construction at each end and spaced 5 feet apart, and transfer the load through the center sills to the center plates for this distance. The main posts are 3 by 2-inch angles, and the intermediates 3 by 3-inch tees. The carlines are of light angles extending from one side plate to the other, and bent so as to give the proper contour for the main roof and upper deck. The projection of the upper deck over the vestibules is composed on the sides of ⅛-inch steel plates, which, with the connections, act as a cantilever for supporting the weight of the vestibule, and as a stiffener to prevent the collapsing or crushing of the vestibule in collisions. The floor is composed of "Acandolith" laid on "Ferroinclave" galvanized iron. The head linings are of "Durite" and the mouldings are generally of cold rolled steel. The outside roof covering is also of "Durite" finished with a canvas covering.

The experience obtained with this car aided the Long Island Railroad Company materially in coming to a decision as to what the future equipment should be, and now they have placed an order with the same company for fifty all-steel coaches. These coaches will, however, be 54 feet 3¾ inches long over body, whereas the coach above described was the same size as the wooden equipment. The new coaches are estimated to weigh 75,500 pounds, complete with trucks. They will have 41½ inches clearance beneath the side sills and top of rail, and are otherwise so arranged that motor trucks may be substituted for the ordinary trucks at any time they may be desired. The center sills are composed of 9-inch, 15-pound channels, with a cover plate 26 by ¼-inch on top and a bottom plate 24 by ⅜-inch extending the full length between the platform sills. The principles involved in the underframe construction are similar to those of the Pennsylvania cars described above, and the general details and style of finish will be the same.

"SANTA FE" POSTAL CAR.

In the latter part of the year 1905, the Atchison, Topeka & Santa Fe Railroad Company began to turn out some postal cars with steel underframes, which are probably the earliest examples of cars of that form used on steam railroads. However, aside from the fish-belly shape of the underframe, they have the conventional appearance of wooden equipment; and, with the exception of plate ends, the superstructure is composed entirely of wood. These cars may, therefore, be classed among the types in which, while the strength of the underframes has been increased so as to better withstand collisions, the risk from fires has not been materially reduced.

ST. LOUIS & SAN FRANCISCO R. R. CAR.

(Plate H.)

Further development in the use of steel in passenger car construction is found in the new equipment built in 1907 at Pullman, Illinois, for the St. Louis & San Francisco Railroad. These cars are for baggage, mail and express service, and are of the composite form.

The steel underframe is nearly the same as that of the Santa Fe postal cars referred to above, except that the outside flange angles of the side sills are omitted, giving a better appearance. The underframe is covered with a ½-inch steel plate on which are provided nailing strips for fastening the floor, the latter being of wood.

The framework of the superstructure is composed of structural steel, to which is bolted wooden furring strips, blocking, etc., and to this the interior and exterior finish is fastened. The latter is composed of ⅞-inch wood sheathing covered with a special type of interlocking metal. The roofing sheathing is covered with galvanized iron. The ends of the car are sheathed with steel plates, and the upper and lower head linings are also of sheet metal. There is considerable wood all through the superstructure, but this is also protected against fire, the car being entirely encased in steel, with the exception of the doors, windows and deck sash.

The railroad company feels that it is unnecessary to go to the expense of an absolutely all-steel car so long as the elimination of the major part of the woodwork results in a reduction of the dangers from fire. The construction used will keep down the first cost, and it is believed that the cost for repairs to such a car will be satisfactory.

MOTOR CARS.

A design of car which has been developed in the last few years and is now receiving a great deal of attention, is the Union Pacific gasoline motor car, built by the Union Pacific Railroad at their Omaha shops. Some twenty of these cars are now in service, and a number more are being constructed; and, aside from the mode of propulsion, they embody some very distinct features from the old construction of railroad cars.

The upper deck and deck sash have been replaced by semi-circular roof, and thereby a reduction of 24 inches in overhead clearance is obtained. The ends of the car are so constructed as to reduce the wind resistance as much as possible. The conventional rectangular windows are replaced with round metal sash 24 inches in diameter. Another noticeable feature in these cars is the absence of vestibules and steps at the ends of the car and the introduction of side doors at the center. The cars are practically all steel.

A general idea of the extent to which the all-steel principle is being applied to this class of equipment may be obtained from the following statement. This statement is not necessarily complete, but covers all the different motor type of cars of which the committee could learn:

TABLE NO. 1.

Road.	No. Cars.	Service.	Built.
Inter. Rapid Transit Co.	300	Subway Electric	1904
Long Island R. R. Co.	134	Suburban Electric	1905
New York Central R. R. Co.	125	Suburban Electric	1906
Hudson Terminal Company	50	Subway Electric	1907
C. R. I. & P. R. R.	1	Motor for Surface Tracks	1907
D. L. & W. R. R. Co.	1	Motor for Surface Tracks	1907
Inter. Rapid Transit Co.	50	Subway Electric	1907
N. Y. & Queens County R. R.	40	Trolley Electric	1907
Union Pacific R. R.	20	Gasoline Motor for Surface Tracks	1906-7
Boston Elevated	45	Electric Elevated	1907
Phila. Elec. Elevated Ry.	80	Elevated and Subway Electric	1906
Union Pacific R. R.	22	Gasoline Motor (Under construction)	

PULLMAN COMPANY — STEEL SLEEPING CAR.

(Plate I.)

The designing and construction of an all-steel sleeping car presents a somewhat more difficult problem than that of an ordinary coach. Nevertheless, the Pullman Company has given the matter considerable study and attention during the past few years, and early in 1907 completed an experimental car, "The Jamestown." This car was also, to a certain extent an exhibition car, and it was one of the efforts of the builders to produce, as nearly as possible, a composite steel car without suggesting in its appearance the use of steel.

The car is equipped with Pullman standard six-wheel trucks, and with a combination cast-steel bolster and platform. The coach is 72 feet 6 inches long over end sills, and accommodations are provided for thirty passengers, which is the capacity of the latest sleepers constructed of wood.

The center sills are composed of 12-inch, 40-pound "I" beams, covered on top with ½-inch plate 30 inches wide, running the full length of body. These center sills are trussed with 1⅞-inch rods. Between the bolsters are four cross bearers, at equal distances apart, to transmit a certain portion of the load on the side of the car to the center sills. The side sills consist of 6 by 6 by ½ inch angles, which also act as the bottom flange of girders forming the sides of the car to the height of the window sills, the web of which is ¼-inch plate and the top flange a 3 by ⅜ inch bar. The latter is reinforced by means of 2 by 2 by 5-16 inch angles framed in between the posts. The rest of the exterior, together with the roof, as well as the interior head linings and side finish, are composed of No. 14 sheet metal. The interior finish includes paneled steel, aluminum and brass. Between the sheets on the sides and ends of car are two thicknesses of asbestos boards for insulation purposes. The window frames are of brass. The floor is of ¼-inch steel plate, on which, with an intervening air space, is laid corrugated metal, and on top of this a layer of ½ inch of "Monolith" cement.

The builders advise that the riding qualities of this car are exceptionally good, and although it was feared at first that the vibratory noises would be annoying, the car is as free from this as any up-to-date sleeper of wooden construction. For the sake of appearances, countersunk rivets were used in the outside sheets.

The Pullman Company have also prepared other designs, in one of which a deep fish-belly box girder is used for center sills, while in another design a fish-belly of angle lattice work is provided in connection with 10-inch channel center sills. The length of these cars is to be the same as "The Jamestown." It is possible that one of these designs will be used in the construction of the next cars to be built.

Since receiving replies to our circular of inquiry, the committee is advised that a second steel sleeping car of one of the later designs has been constructed and is now running regularly on the "Overland Limited."

EUROPEAN STEEL CAR CONSTRUCTION.

One of the members of this subcommittee had the opportunity to spend a couple of months in Europe this last winter, which time was partly devoted to the examination of a number of car works in England, France, Germany, Sweden, Austria and Hungary, with a view to learning European practices in regard to the building of steel cars, so that the benefit of such investigations would be available to the Master Car Builders' Association in this report.

These investigations revealed that while steel underframe cars have been in use in Europe for forty or fifty years, or perhaps longer, there are very few passenger cars being built in any of the shops visited in the various countries enumerated, in which passenger cars were built, with steel upperframes as well as with steel underframing, the general practice being to place a wooden body on a steel underframe and covering the outside of the body with 1-16-inch steel plates, which gives the appearance of the steel car, these steel cover plates being secured with small screws to the wooden posts, sill and braces.

The underframe is constructed in numerous ways, some being of the fish-belly type, made either in pressed steel or of plates and angles, and the other types being usually "I" beam or channel side sills held from deflection by means of truss rods in the way usual on wooden cars. The construction of these underframes is, however, of such nature, due to the quite different way in which the draft riggings are applied to European cars, that nothing of importance can be learned from them, the draft arrangements being of the continuous type and the buffing stresses being taken on side buffers. These cars have no heavy center sill construction, as is required on American cars, where not only the pulling, but also the buffing stresses are generally taken by the center sills.

A notable feature in connection with European cars is that all trucks, whether four-wheel or six-wheel, used on the later equipment, are made of steel, no wooden trucks being used. The steel trucks are of various constructions, but the majority are of pressed steel of either the Fox type or types resembling the Fox. A number of trucks are, however, in use in which the side framing and cross framing are composed of "I" beams, channels and angle irons.

As far as could be learned by conversation with engineers and builders of railroad cars, no consideration or study is being given to the development of an all-metal passenger car, and no attempt is even being made to utilize the steel plates on the outside to carry part of the lading, the total load being carried on the underframe, regardless of the construction of the upper framing.

GENERAL REMARKS.

The development of a steel passenger car from what has been said in regard to what is being used abroad, may be considered an American innovation of the last few years. On account of the lack of available data the progress has necessarily been slow, and generally of what may be called an experimental nature.

The development in steel motor cars seems to have been more rapid than in steel railway cars. This is probably due to the fact that the service in which the motor equipment is used is such as to make protectionary measures against injury from fire of primary importance; whereas, with the steam cars the development seems to have been retarded for the same reasons which were advanced against the steel freight cars when they were first introduced — i. e., first cost, excessive weight, difficulties of repairs, corrosion, etc., limiting the life of the cars. These objections have, however, been — through the experience obtained with steel freight cars — practically eliminated; as, for instance, the cost, which was the feature given the most consideration, is now not so important as the question of providing a car sufficiently strong for the service regardless of a somewhat increased first cost.

The increased cost of a steel passenger car over a wooden car of the same general construction and size, and with the same specialties, should not be very great when a number of cars of the same design and and general type are built. The few, of what may be called sample cars of steel, enumerated above, which have been built in the past, have, of course, been very costly as compared with wooden cars, but this has been due to the great cost of getting up designs, appliances, etc., for their manufacture, all of which will be greatly reduced in the future, and especially on larger orders for cars. It should always be borne in mind when the use of steel cars is contemplated, that such cars may be obtained at very much less cost if some type of car is decided upon, of which cars have already been built, instead of making new designs, often embodying a number of changes more or less important, which in many instances could be dispensed with.

The question of weight of steel passenger cars was perhaps the next important consideration, but from what has already been accomplished the problem seems to have been solved, and if proper care is exercised in the design, so as to place the material in the car to the best advantage for strength, etc., there is no reason at all why the construction of cars containing all steel, or steel and partly non-inflammable material, can not be produced, which cars would be much stronger than wooden cars, and with practically no increase of weight per passenger as compared with the wooden cars of the same general type and capacity.

In Table No. 2, below, is given a comparison between some typical wooden coaches with three of the all-steel design of coaches, and this comparison shows quite favorably for the steel car when the column giving weight per passenger is considered, and this is the only true basis for consideration. It is possible that still better results may be obtained in the future without the sacrificing of strength.

TABLE NO. 2.

Class or No.	Road	Material	Length Over Body Feet	Seat Capacity	Weight	Weight per Passenger	Weight per Foot
290-295....	Lehigh Valley...	Wood	70	77	118,000	1,530	1,685.7
1015-51....	Frisco..........	"	70	80	106,200	1,327	1,517.1
P. L.	Pennsylvania....	"	70	80	106,000	1,325	1,514.3
1st Class...	N. Y. C. Lines...	"	61	76	92,800	1,221	1,521.3
P. K.......	Pennsylvania....	"	53.75	62	85,000	1,373	1,581.5
Average ..	....	....	64.95	75	101,600	1,355.4	1,563.9
P-70.......	Pennsylvania....	Steel	70.75	88	116,100*	1,319	1,652.6
Coach.....	Southern Pacific.	"	60	70	107,000†	1,528	2,546.6
Coach.....	Union Pacific...	"	68	78	89,300†	1,145	1,313.2
Average ..	....	....	66.25	78.6	104,133	1,330.6	1,837.046

*Includes storage batteries. †Includes storage batteries and axle generator.

The life of steel passenger cars is yet to be determined, but judging from experience obtained abroad with steel underframes in passenger cars, which, as stated before, have been in use for some forty to fifty years, and some of which have been in service for twenty-five to thirty years, as well as from the experience already obtained in this country with steel freight cars, some of which were placed in service as early as 1884 and are still in service, it would seem that a carefully designed and constructed steel passenger car, in which the tendency toward loose rivets will be reduced to a minimum, should last a great number of years, depending upon how long a structure of this kind can be preserved with paint and other means of preventing corrosion. It is generally supposed that passenger cars of steel will receive better attention than freight cars, at least such has been the experience with the wooden car equipment. The rivet work is, however, a feature which should receive special attention, for if the construction is such as to permit vibration or deflection, producing undue stresses not anticipated or provided for, trouble may be expected.

It is also felt that the rivet heads should not be considered as an objection when used in the exterior finish of the car, as they may be neatly arranged with respect to size of heads, location, etc., and, further, to countersink the rivets is objectionable in thin plates on account of decreased strength and liability to work loose; but, on the other hand, rivet heads have been found, in European practice at least, to gather around them a great deal of dirt, difficult to remove and maintain a good appearance on the exterior of the car. It would therefore be up to the designer, as well as to the users of cars, to decide as to which is the most preferable. European practice seems to favor the use of the countersunk heads where practicable, and the ordinary rivet heads where less objectionable to the finish of the car and where they can not be successfully avoided without increasing the material or other complications.

Mechanical officers of railroads differ greatly at present as to the best methods in design for overcoming the objectionable features of the wooden passenger cars. Varying local conditions existing on roads on which steel cars have been put in service also had much to do with the widely different forms of design and construction that have so far been made use of in this country.

In a general way, however, the steel equipment already in service can be identified under one of three forms, i. e.:

1. Cars with steel underframing and wooden superstructure somewhat similar to the methods employed in modern steel freight car construction in which the underframing is of steel;

2. Cars with steel underframing and steel upperframing, such as posts, braces and carlines; the balance of the material being of wood, or part fireproof material; or, in other words, a "composite" car with perhaps steel on the outside in place of wooden sidings;

3. All-steel cars — i. e., cars made up of steel or metal throughout, with the possible exception of small quantities of wood and fireproof material for filling blocks, insulation and interior finish, such as mouldings, etc.

In Table No. 3, given below, is a list of cars already built, or under construction, most of which have been referred to in this report. This table also gives the general forms of construction, weights, etc., together with the approximate order in which the cars were completed or are expected to be in service. In making comparisons between the different types of cars, the weight of storage batteries, generators, etc., which may be used on some cars and not on others, should be taken into consideration.

RÉSUMÉ.

A summary of the above will show that the steel car equipment for steam railroads now in service or under construction, and coming within the scope of this report, is composed of about 380 units. Nine railroads and four or five car companies figure more or less in the operation and production of these cars. The greatest development is shown in the East, which is no doubt stimulated by the many tunnels in and around New York through which the cars of steam railroads will pass, and in the construction of which cars steel and fireproof material is considered to be essential in order to insure safety.

TABLE No. 3.

ROAD	No. of Cars	Service	Form	Seat Cap.	Wt. of Truck	Wt. of Body	Total Weight	Wt. per Passenger	Kind of Truck	Length Over Body	Apprx. Date 1st Car in Service	Builder
Ill. Central...	17	Sub. Pass ...	Composite	100	23,200	61,400	84,600	846	4-wheel	65' ½"	Sept. '03.....	Ill. Cent.
Interborough..	300	Passenger Electric Tunnel	All Steel....	52	13,000 Motor.. 9,100 Trailer.. 12,600, 2 Motors	41,836	75,596	1,454	4 "	41'	June '04.....	A. C. & F. Co.
Erie R.R.	1	Baggage.....	......	.....	40,600	66,080	106,680	....	6 "	60' 1"	"	Std. S. C. C.
Long Island..	134	Passenger Suburban ..	"	52	14,000 Motor... 9,600 Trailer. 14,430, 2 Motors	45,988	82,138	1,580	4 "	41'	Apr. '05......	A. C. & F. Co
Erie R.R.	1	Postal......	"	.....	40,600	74,080	114,680	....	6 "	65' 2"	May '05......	Std. S. C. Co.
Santa Fe.....	39	"	Steel Underframe	.....	....	....	105,000	....	6 "	60' 9¼"	Nov. '05.....	A. C. & F. C.
Erie R.R.	1	Express.....	All Steel......	.....	40,600	66,080	106,680	....	6 "	60' 1"	"	Std. S. C. Co.
N.Y.N.H & H.	2	Postal......	"	.....	36,000	73,800	109,800	....	6 "	65' 2"	Apr. '06.....	"
Southern	3	Pass........	Composite	72	36,200	73,600	110,000	1,527.7	6 "	66'	June '06......	P. S. C. Co
N.Y.C. & H.R	125	Surburban Passenger..	All Steel	64	15,000 Motor... 11,140 Trailer.. 12,160, 2 Motors	67,170	105,500	1,648	4 "	50'	"	A. C. & F. Co.
Penna.......	1	Pass........	"	72	25,100	78,450	103,550†	1,438	4 "	58' 5¾"	July '06......	P. R. R. Co.
So. Pacific...	1	"	"	70	31,500	75,500	107,000‡	1,528	4 "	60'	"	S. P. Ry.
Long Island ..	1	Sub. Pass...	"	72	22,000	66,800	94,500†	1,312	4 "	58' 6"	Sept. '06.....	A. D. & F. C.
Penna.......	1	Baggage....	"	.....	25,100	67,900	93,000†	....	4 "	60' 10⅜"	Nov. '06.....	P. R. R. Co.
So. Pacific...	1	Postal......	"	.....	....	....	119,800‡	....	6 "	60' inside	Apr. '07......	S. P. Ry
Pullman.....	1	Sleeping.....	"	.....	....	....	160,000†*	....	6 "	72' 6"	"	Pullman.
Hudson Co...	40	Passenger...	"	44	13,900 Motor.. 9,850 Trailer.. 10,400, 2 Motors	40,400	74,550	1,694	4 "	38' 2¼"	May '07......	A. C. & F. Co.
U.P. Ry......	1	Postal......	"	.....	....	....	119,800‡	....	6 "	60' inside	June '07.....	U. P. Ry.
U.P. Ry.	1	Pass........	"	78	....	....	89,300	1,144	4 "	68' over end	Oct. '07......	"
Penna......	5	Postal......	"	.....	39,000	89,500*	128,500‡	....	6 "	71' 4"	Feb. '07......	P. R. R. Co.
Interborough.	50	Passenger Electric Tunnel	"	48	....	33,740	78,696	1,639	4 "	39' 2"	Nov. '07......	A. C. & F. Co.
Penna.... ...	1	Pass.......	"	88	25,100	91,000	116,100†	1,319	4 "	70' 3½"	Dec. '07.....	P. R. R. Co.
Penna.... ...	1	"	"	64	25,100	70,300	95,400†	1,490	4 "	53' 5¼"	Mar. '08......	"
Frisco.......	25	Baggage....	Steel Underframe, Composite Top ..	.....	40,300	65,900	106,200	....	6 "	60' 9½"	Feb. '08......	Pullman.
Frisco..	6	Mail & Ex...	Steel Underframe, Composite Top ..	.....	40,300	74,500*	114,800*	....	6 "	70' 1"	Building.	"
Penna.......	154	Pass........	All Steel......	88	25,100	91,000†	116,100†	1,319	4 "	70' 8½"	"	A. C. & F. Co.
Penna.......	22	Baggage....	"	.....	25,100	67,900	93,000†	....	4 "	60' 10⅜"	"	P. S. C. Co.
Penna.......	10	Dining......	"	.....	39,000	101,000*	140,000†*	....	6 "	71' 4"	"	P. R. R. Co.
Penna.......	14	Postal......	"	.....	39,000	89,500	128,500‡	....	6 "	71' 4"	"	A.C. & F. Co.
Penna..	5	Pass. Bagg ..	"	42	39,000	81,000	120,000†	....	6 "	71' 4"	"	P. S. C. Co.
Long Island ..	50	Sub. Pass...	"	72	25,100	50,400*	75,500*	1,049	4 "	54' 3¼"	"	A.C. & F. Co.
Lehigh Valley.	15	Express	Steel Underframe......	.....	19,000	72,000	110,000	....	6 "	67' 8"	....	H. & H. Co.

*Estimated.
†Includes storage batteries.
‡Includes storage batteries and axle generator.

Total according to form:
- 85 Steel underframe.
- 21 Composite.
- 275 All Steel.
- 380

Total according to service:
- 230 Passenger.
- 16 Express.
- 63 Postal.
- 49 Baggage.
- 1 Sleeping.
- 10 Dining.
- 11 Combination.

STANDARD SECTIONAL AREA.

There appears to be a considerable difference of opinion among railroad men to-day as to what end shocks and stresses should be anticipated in the construction of the car. This may be due in a measure to a lack of reliable information on just what occurs in collision; but the varying length of train, difference in speeds, and other operating conditions are also elements which go to control.

There is also a difference in ideas among designers as to how the stresses in a car had best be met, so that from this, together with the foregoing, new cars are being constructed along entirely different lines. These different designs, however, may be divided into three types, to wit:

First: That in which the load, due to the weight of the car body and lading, is carried by side girders; an additional girder being provided through the center of the car for the pulling and buffing strains. An illustration of this class is the New York Central motor car. (See Plate B.)

Second: That in which the load, due to the weight of the car body and lading, is carried by the center girder, which at the same time takes care of the pulling and buffing strains. Under this class would come the Pennsylvania Railroad car. (See Plate D.)

Third: That in which the center and side rails with truss rods and the general construction of wooden cars is reproduced in metal. The Southern Pacific car (see Plate E) may be given as an example of this class.

These types of course can, and they do, exist somewhat in combination, an example of such combinations being the Erie and Southern cars (see Plates A and C), where a portion of the load of the car body and lading reaches the trucks through cantilevers and the center sills, while another portion is transferred to the trucks from the sides of the car through the bolsters. The center sills, therefore, resist the end shocks and assist in carrying the load.

The type also influences the weight, but to what extent the disadvantage of increased weight with any one type is offset by other disadvantages of some other type has yet to be determined. The argument in favor of each has been presented earlier in the report.

The center sill area of the cars given for illustration is as follows: For the first class 10.66 square inches; for the second, 50 square inches, and for the third, 18.52 square inches.

As will be observed, these areas differ widely, but it is not at all probable that the cars were designed for the same end shock. However, had this been the case, from a careful study of the conditions it is plain that the areas would still have differed; so that from this and so long as cars of these different types are built it is not considered practical to recommend a uniform section of center sill, nor a standard sectional area, as on the disposition of metal in a section largely depends its value.

In addition, before this could consistently be done it would be necessary to standardize the different lengths of passenger equipment cars, and if the three types of construction are to be perpetuated, dispose of the question of straight versus fish-belly center sills and the provision of side doors — in short, the framing of the car almost as a whole.

It is possible, however, to adhere to limiting conditions so that with the use of rational methods of calculation we can accomplish closely the same purpose.

For freight cars it has been the practice for some roads to assume that a car must withstand end shocks equivalent to 300,000 pounds compression whenever the car is shifted, and such shocks are often equivalent to 500,000 pounds. The center sill construction of these cars has been such as to enable it to resist this shock without exceeding the elastic limit of the metal, and from the past five years' experience it is believed that this basis is none too high.

According to report of tests made on the L. S. & M. S. Ry. in 1902, the buffing stresses ran frequently over 300,000 pounds, and the indications were that draft gears and underframes should be capable of withstanding pulling stresses of 150,000 pounds, and buffing stresses of 500,000 pounds. The dynamometer car, in being shunted against a loaded 60,000-pound furniture car at 33¼ miles per hour, gave a record of 381,700 pounds, the capacity of the recording apparatus, and what the actual shock was is not known. From tests made on the Pennsylvania Lines West a dynamometer car weighing 51,000 pounds was allowed to descend a grade at seven miles per hour, from which a shock of 607,000 pounds (the capacity of the machine) was recorded. A loaded steel freight car and the dynamometer car, weight 181,400 pounds, striking another car at 3.9 miles per hour, caused a shock of 400,000 pounds. It is true that these tests were made with freight equipment and under abnormal conditions, but as the cars in all classes of steam service come together and are coupled at speeds equal to, or in excess of those mentioned, it would not be safe to assume end shocks of less than 400,000 pounds.

In collisions between passenger and freight cars the passenger cars should not be seriously damaged, which requires the passenger car center sill construction to be at least as strong as that of the strongest freight cars. For passenger cars it is advisable to use a higher factor of safety, therefore the center sill construction in passenger equipment cars used in through trains should be capable of withstanding a shock of 150,000 pounds on the draft gear and 250,000 pounds on the buffers, making a total of 400,000 pounds compression, in which the combined stresses should be 12,500 pounds per square inch, and in no case exceed 15,000 pounds per square inch. For cars used strictly in suburban service — in comparatively short trains with coaches of the same size — the fiber stress might be increased to 20,000 pounds, but this figure should not be exceeded.

UPPER DECKS VERSUS SEMI-ELLIPTICAL ROOFS.

As there is such a radical difference of opinion among the committee as to the relative merits of steel passenger cars with upper decks, and those with semi-elliptical section without upper deck, it seems wise and proper to place before the Association the claims of the advocates of each type of roof. For purposes of discussion the subject naturally resolves itself into: (1) relative strength; (2) relative safety; (3) appearances — inside and out; (4) cost and economy; (5) ventilation.

By consultation, a marked difference of opinion of prominent railroad mechanical men and designing engineers has been developed. Some have criticized the semi-elliptical roof, on account of the lack of ventilation and inartistic appearance. One has stated that the semi-elliptical roof reminds him of an old-style prairie or Conestoga wagon (prairie schooner), and as a backward step. Others are strongly in favor of this departure from the upper deck, on account of claimed superior strength, appearance, cheapness and economy of construction, and more particularly on account of its claim for having superior ventilating facilities.

One Superintendent of Motive Power writes: "The upper deck in the modern wooden car equipment was originally devised as a means for improved ventilation, and at the same time found favor as a means for variety in design. At its first introduction it was thought necessary to run carlines from plate to plate at intervals of five to eight feet apart in order to hold the sides of the car together at the plate. At this time I think it is safe to say that the largest car was not over forty-five feet over end sills, and in the progress of passenger car designing these through carlines were left out, and from time to time five feet more were added to the length of the car until we reached our present length, and in each slight successive increase, the strength of the roof was entirely ignored, and we can find now among our older cars where the roof framing is of the same cross-section in regard to strength of timber and iron carlines as any of the modern cars, and the result is that almost any car we measure will be found to be bulged out as much as one inch, or more in some cases, at the side plates in the center of the car on cars not strengthened with partitions, due to the weight of the roof bearing on the edge of the lower deck carlines.

"For appearance a modern semi-elliptical roof must not be confused with the old type of cars with a flat arched roof."

Another Superintendent of Motive Power writes: "We believe that, on account of the additional strength that can be gotten in the roof without an upper deck, if the ventilation can be properly taken care of, makes it desirable to consider this form very carefully in building steel cars. We have not had sufficient experience, however, to know whether proper ventilation can be gotten with this type of roof."

A General Superintendent of Motive Power writes: "The upper deck type of roof is stronger than the semi-elliptic section, and will probably weigh very little, if any, more. Furthermore it permits the use of deck lights, which we believe to be essential."

A prominent Engineer states: "As regards the strength, I believe the style of roof carline used with the upper deck can be equally as strong as the carline for a semi-circular deck with the same depth of roof from the eaves to the crown, or at least practically so, without any undue increase in weight, and the idea of some that if the car roof is constructed in semi-circular shape it is practically non-collapsible if a car is turned over in a wreck, can not be successfully maintained, and whatever increase in strength, if any, there may be obtained by that construction is of practically no value."

The double deck or clear-story roof of the present day steam road car is largely the result of customary and generally satisfactory practice. The same style of roof was used on the ordinary horse omnibus and old English stage coach of the last century. The advocates of the abandonment of upper deck roofs claim that on account of the many inherent weaknesses and disadvantages, and the present high speed of trains and high class requirements, a close analysis of this style of roof will show quite clearly that the philosophic advantages are very insignificant, while the disadvantages are certainly quite marked.

RELATIVE STRENGTH.

The advocates of the semi-elliptical roof argue that the relative strength of such a roof, as compared with a multi-angular double-deck roof, is apparently conclusive as to the superior strength of the semi-elliptical roof. The double deck roof, as Fig. 1, Plate J, illustrates, is composed of six sharp angles — six points where there is practically no elasticity whatever — which is weakening to the structure itself. In addition, at each one of these angles is a joint, a conjunction of parts, an inherent weakness of design.

With the heavier equipment, steel or iron carlines have been introduced to reënforce the wood; but these steel carlines unsupported are extremely fragile, and frequently lose their shape and are often damaged in handling before same can be applied to the cars.

In constructing a new passenger coach, the roof of the car, as generally built, has to be supported from the floor by posts until the sheathing and lining are complete, so as to make it self-sustaining. In the semi-elliptical roof, the posts and carlines are, as a rule, made as one steel unit with no joints; as illustrated by Fig. 2, Plate J, it is claimed of much lighter construction than any wood or combination material ordinarily used in the double-deck type of roof, and extends from one side sill up over the roof and down, joining into the other sill, forming one of the strongest shapes known — self-supporting from the time it is fastened to the side sill, each member reënforcing and adding strength to its additional members; the efficiency and strength of such designs seems obvious to its advocates.

The adherents of the upper-deck type of roof contend that the claims for superior strength in the semi-elliptical roof are based more on theory than any practical proof. It is believed that the style of roof carline used with the upper deck can be made in every way as strong as for the carline for a semi-elliptic roof, having the same depth of roof from eaves to crown, or at least practically as strong and without any undue increase in weight. The claim that a roof of semi-elliptical shape is practically non-collapsible, if the car is turned over in a wreck, is questioned by its opponents. It is interesting to note that in recent construction on British and European railways the upper-deck type of roof is rapidly superseding the semi-elliptical type wherever the restrictions of tunnels will permit the change. This would indicate that the roads who have longest used semi-elliptical roofs find them less satisfactory than the American upper-deck roof. Some members of the Association are familiar with a large number of passenger cars in the East constructed without any heavy upper-deck sills or plates, but every carline was a through carline so constructed as to be practically free from any weak corners or joints. Decks made in this manner were over 1,000 pounds lighter than the regulation upper deck, and though lighter, much stronger and had less tendency to spread. If an ordinary upper-deck section is framed in like manner to the semi-elliptic roof it is claimed possible to have all the advantages of the upper deck combined with any possible advantages of the semi-elliptic form.

SAFETY.

The advocates of semi-elliptical roofs claim that in case of derailment, the sides of the car are held together with a double-deck roof by such a weak construction, that the superstructure is most generally distorted out of shape, frequently going to pieces entirely; and, in cases where cars turn over, the roof frequently collapses, the car frame is always racked to such an extent that it has to be rebuilt. The superiority of the semi-elliptical roof, with its unit post and carlines, and its reënforceing properties, seems to them self-apparent; and the liability of disrupting a structure of this kind is immensely decreased.

They argue further that the roof of a car, like the roof of a house, is a not particularly attractive feature of the structure from the outside. It has no bright colors, nor any lines that tend to make it attractive. While the semi-elliptical roof is a novelty, it may attract attention; the curves and lines of this roof are certainly as attractive as the ordinary double-deck roof, but this point of outside appearance seems insignificant.

These claims for greater safety of the semi-elliptical roof are denied by the other side as being only theoretical and far-fetched and incapable of proof.

It is remembered by some members of the Association that about twenty years ago a considerable number of coaches and sleeping cars were constructed with what is known as the "Mann" roof. Several of these cars were in wrecks, and where overturned there never was any marked superiority shown as to strength to resist punishment in the cars having these strongly constructed "Mann" semi-elliptical roofs. One important objection to the semi-elliptical form is that in order to meet clearance dimensions of many eastern tunnels the inside clear height would have to be considerably reduced, with marked objections to such a contraction in inside height. (See Fig. 3, Plate J.)

APPEARANCE.

The friends of the semi-elliptical roof state that in the interior of passenger equipment, the tendency has been toward the elimination of straight lines and angles, and to gradually approach the semi-elliptical shape; that the upper deck of most of our cars has been rounded, making a segment of a circle. The semi-elliptical roof, having the appearance of a regular well-defined arch, is novel; but with its increased possibilities of decoration they believe the appearance of a semi-elliptical roof would seem to have many advantages over the double deck.

The opponents of semi-elliptical section consider, for general adoption in the East, at least, that the necessary reduction of height to suit clearance requirements of tunnels would materially detract from the roomy appearance of cars so designed, and they point to the photographs of interiors of such cars. They refer to the less roomy appearance of the large number of European cars, which have semi-elliptical roofs. They refer also to the considerable number of Mann roof cars built formerly for New England roads, which were found noisy and generally objectionable by patrons of the roads, so much so that the use of such designs was abandoned after a few years.

COST AND ECONOMY.

It is claimed by some that the first cost of the double-deck roof is necessarily greater than the semi-elliptical, and its maintenance the same. That with the double-deck roof, the expensive fitting of deck sash, the expensive repairs necessary to the fastenings, weather strippings, etc., replacement of lights, and the flashing of roof, unquestionably means more expensive cost of maintenance.

With the semi-elliptical roof, it is claimed that the continuous headlining from one side to the other, the continuous roof from one side to the other, on the outside, plain surfaces, the lack of corners to crack, the lack of crevices to hold dust, dirt and moisture, the complete protection from water and its consequential damaging effects, are all indicative of the low cost of maintenance.

The upper-deck advocates concede that there may be a slight difference in first cost and in maintenance, but that the advantages to the passenger more than compensates the railroad, and warrants it in expending the slight additional amount.

VENTILATION.

The claims for superiority in ventilation with the semi-elliptical roof are argued as follows:

The idea of the deck sash expelling the foul air from the interior of the car and at the same time providing an intake for fresh air — in other words, performing two purposes diametrically opposed to each other, is, on the face of it, illogical and unreasonable.

With the deck-sash ventilation, the same is entirely dependent for its movement upon the difference in temperatures of the fresh and foul air — in other words, upon the gravity system; and in a railway coach, moving from forty to sixty miles per hour, the air currents incident to the movement of the train through the air, and the consequential air pressures, are so great in their influence, as compared with this movement of air incident to the gravity force, that the latter is almost entirely overcome.

The impossibilities of regulating the temperatures of the ordinary passenger equipment to the satisfaction of the general public are unquestionably partially the result, if not largely the result, of improper ventilation — insufficient supply of oxygen for the human lungs. Thus, this insufficient supply of fresh air produces physiological results upon the human system of respiration, and that, in turn, causes discomforts apparently from heat to cold. Some are too hot, while others are too cold. Experiments have shown that with a well ventilated car the temperature inside could be varied from 66 to 74 degrees without the slightest interference with the comforts of the passengers.

Furthermore, there are a great many thousand double-deck passenger cars in service, and there have been a great many experiments and a great many able men have devoted their energies to perfecting a ventilating system for this style of equipment, but without any practical success up to the present time.

The greatest success in the ventilating of the double-deck passenger equipment has been obtained by one large railroad system and one large private car builder, by the use of exhaust or suction ventilators in the roof, *with the deck sash tightly sealed;* thus, in obtaining improved ventilation, one of the first steps in the development is to tightly close and put out of use the deck sash.

The poor ventilation obtained from the gravity system, or from deck sash, being inadequate for the present requirements, a mechanical system of ventilation seems imperative. This, therefore, is obtained by the location of suction ventilators pulling out the foul air from the top of the car, and suitable intakes furnishing fresh supply of air at the floor line of the car.

The semi-elliptical roof, therefore, with the improved methods of ventilation, is just as effective — and it is claimed more so, than the ordinary double-deck roof.

The users and advocates of upper-deck roofs feel assured that no claim for advantages in ventilation can be claimed for the semi-elliptical roof and that this has been extensively proven by the large number of coaches and sleepers heretofore built with the long since abandoned "Mann" roof. They further point to the fact that European roads are rapidly adopting the American upper-deck roofs on account of the well-recognized superior ventilation possibilities. It is argued than any improved system of ventilation is equally effective and generally more easily applied on cars having upper decks.

The introduction of steel in place of wood, for passenger equipment, from present indications, is a foregone conclusion. Yet it seems reasonable — in fact, it almost seems imperative — that with the introduction of steel for building passenger equipment, the design of car should be so modified, and the frame so constructed as to utilize to the maximum extent all the structural properties of the steel material.

It is evident that the forms and designs adopted to utilize wood to the best advantage do not necessarily apply to metal. Therefore, it would seem not unwise that efforts should be exerted to develop a car of the maximum efficiency, independent of stereotyped forms of construction, developed by practice and usage in wooden cars.

The principal arguments for and against the present generally adopted form of upper-deck roofs on American railroad cars are so directly contradictory and at variance that your committee deem it difficult and unwise to attempt to draw conclusions and so content themselves with laying the arguments thus fully before the Association, leaving it for time and public sentiment to bring about the "the survival of the fittest."

BEST CONSTRUCTION OF FLOORING.

While a vast amount of experience has been gained in the use of various materials as floor coverings in buildings, etc., wood alone with some textural covering has been used to the greatest extent in passenger car work.

Under the modern conditions of car design, the first consideration is the safety of the people carried.

Thus it is that a metal or metal and composite construction should be used for floors, particularly in cars of steel design, to eliminate, as far as possible, injury done by wheels or parts of trucks or any outside substance punching through same in case of an accident.

A great many kinds of material have been suggested; still for safety there are good arguments for starting with a steel floor of some considerable thickness.

Many of the designers and builders to-day are using nothing but a plain or special corrugated steel or iron sheet extending from side to side of car. This, of course, affords but very little protection from outside interference in case of wreck. To this corrugated steel floor a plastic floor is applied, mostly composed of sawdust and magnesia cement.

Coverings called under various trade names, such as Monolith, Karbolith, Asbestolith, Acondolith, Flexolith and other mortarlike combinations of asbestos and cement, have been used in combination with steel plates, wire netting and rolled shapes.

The requirements for maximum insulative properties against sound and heat are probably met in most of these products equally well. These, however, are requirements that are most essential in passenger car work and too much stress can not be laid upon them. It is expected, however, that their surfaces should be impervious to hot or cold water, and be frequently flushed and cleaned without deterioration of the material constituting the floor.

Your committee does not believe that it is within its province to recommend a standard floor construction, but suggests that the floor construction of a steel passenger car should embody elements to obtain the following results:

1. Fireproof surfaces — outside and inside.
2. Resistance against loose brake gear, wheels, etc.
3. Resistance against transverse and diagonal strains.
4. Resistance against breakage from vibration.
5. Non-conductor of heat.
6. Minimum of weight.
7. Non-conductor of sound.
8. Satisfactory walking and wearing surface.

Sections of various designs of floors are shown in Plate K.

RELATIVE MERITS OF VARIOUS MATERIALS FOR INSIDE FINISH FOR FIREPROOF CONSTRUCTION.

There is a great deal of difference of opinion as to how far it is advisable to substitute metal and fireproof construction for wood, and whether it is advisable or actually necessary (at least on surface railroads) to go to the extreme, or in other words, to eliminate all wood.

Many designers feel that there can be little practical objection to the use of a limited amount of wood — as, for instance, for seat arms, sash mouldings and other interior finish — so long as the use of steel in the underframing and the elimination of a large section of wood in the superstructure, which would be liable to fire, heat and splinter, is provided for. For it is believed that the window glass is just as dangerous, if not more so, to passengers when cars are wrecked as the kind of woodwork referred to above would be. It has been suggested that perhaps it would be a benefit in some cases — as, for instance, in tunnels where the windows are of very little benefit as far as light is concerned and practically nothing may be seen from the windows — that the glass would be made with interwoven metal screens.

The committee consider that, as a general proposition, the most desirable materials for inside finish for steel passenger cars should have the maximum advantages as to —

Durability,
Non-inflammability,
Insulating qualities,
Non-hygroscopic qualities,
Lightness,
Neatness of appearance,
Reasonable initial cost.

It is conceded that the material which meets most of these requirements is light sheet steel. This material is not always feasible for use in all locations. Artificial board, aluminum, and in some cases fireproofed wood or other material, are often better suited for interior finish above the window sills and for the head lining. Aluminum has the advantage of lightness, but it is comparatively expensive.

Interlocking sheet steel sheathing has been recommended for interior finish between floor and window sills.

Brass and copper might be used with good effect, but to most railroads their price is prohibitive.

For mouldings, finishing pieces, etc., very serviceable and adequate material may be procured in drawn steel and aluminum.

There are many kinds of artificial boards on the market, more or less fireproof and all hygroscopic with the exception, possibly, of Transite. Unfortunately, with most of these the fireproof qualities are in inverse ratio to the hygroscopic qualities. These artificial boards are made up from different bases of asbestos, wood pulp, etc., combined with cement and other ingredients. The artificial materials which have been mostly used are as follows:

Transite
Durite,
Fiberite
Uralite,
Vitribestos,
Indestructible Fiber,
Composite Board,
Service Board,
Agasote (Impermeable Mill Board).

Samples of each of these are on exhibition with weight per square foot of material ¼-inch thick marked thereon.

Fireproofed wood is not generally recommended for interior finish for the reason that the fireproofing chemicals are apt to exude, and spoil the finish and the process at present is not always permanent. To be properly fireproofed the weight of the wood should be materially increased

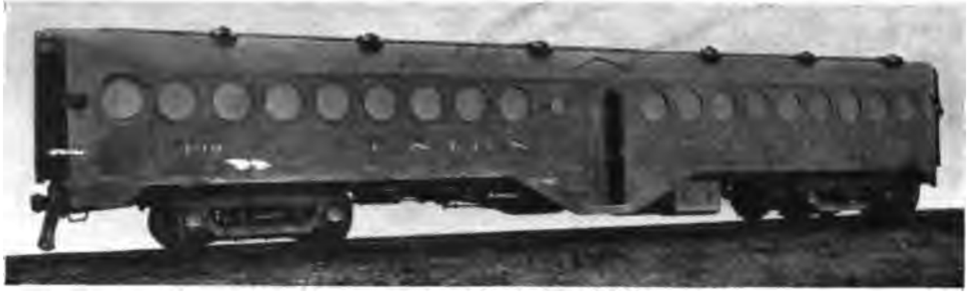


PLATE F.—UNION PACIFIC R. R.

by reason of the chemical treatment, and these chemicals also corrode any steel, wood screws, nails, etc., which come in contact with them.

One of the most important features for inside finish is insulation against heat and cold. Not only should an air space be provided between inside and outside finish, but any metallic substance used for inside finish should be backed up with some non-conductive material. Steel or aluminum plates backed up with Ceilinite, an asbestos cloth, have been tried.

The whole question of material for inside finish from a standpoint of insulation against heat and cold has not been thoroughly worked out, and is a subject to which manufacturers should give prompt attention, looking toward the speedy production of a serviceable product that is permanently fireproofed.

CONCLUSION.

The entire subject of steel passenger car construction, as may be seen from the above report, is as yet largely in an experimental state, and it is quite difficult, if not impossible, to draw definite conclusions or give definite recommendations which would be suitable to all conditions. From the determined manner in which the construction of steel passenger cars has been taken up by so many railroads and manufacturing companies during the last few years, further interesting and valuable information will unquestionably be obtained in the very near future. It is to be hoped, however, that an effort will be made toward uniformity in construction and design in order that the most satisfactory results may be obtained.

Your committee, in closing its report, wishes to call attention to the very interesting illustrated descriptive articles giving the details of construction of several of the latest designs of steel passenger cars that have appeared the past year in the *Railway Age*, the *Railroad Gazette*, the *Railway Review*, and several other technical journals; and also to the interesting and valuable series of illustrated articles which have appeared regularly for the past few months in the *American Engineer*, discussing steel passenger cars from a technical and theoretical as well as a practical standpoint.

A. M. Waitt, Chairman,
W. R. McKeen, Jr.,
T. Dunbar,
J. McE. Ames,
C. A. Lindstrom,
W. B. Ott,
R. L. Gordon,
Committee.

Mr. Waitt: The .committee wishes to express its thanks to the *American Engineer* for giving a large number of cuts to the Secretary for the use of the Association in preparing this report.

I wish also to call attention to a descriptive article of the St. Louis & San Francisco cars, that appears in the *Daily Railroad Gazette* of this morning, which will be of interest to you all.

Mr. Brazier: I move that the report be accepted and the thanks of the Association be extended to the committee for its very able and interesting report.

(Motion seconded and carried.)

The President: Is there any discussion? If not, we will proceed to the next order of business.

The Secretary: I am requested to give notice that the shoes tested by the Brake-Shoe Committee and on which report was made, will be on exhibition just outside the door of this hall at 2 P.M. to-day.

There will be a meeting of the Executive Committee at the Marlborough-Blenheim at 3 o'clock to-day.

I have the report of the Nominating Committee, which is as follows:

To the Members:

Your Nominating Committee begs to recommend the following officers for the ensuing year in line with the President's remarks at yesterday's meeting, relative to the necessity of a closer affiliation of the Master Car Builders' Association with the American Railway Association. The officers nominated are as follows:

President, R. F. McKenna; First Vice-President, F. H. Clark; Second Vice-President, T. H. Curtis; Third Vice-President, LeGrand Parish; Treasurer, John Kirby.

Executive members: J. E. Muhlfeld, C. E. Fuller, H. D. Taylor, J. F. Walsh, C. A. Schroyer.

Respectfully submitted,

J. S. Lentz,
F. W. Brazier,
J. A. Buker,
H. D. Taylor,
W. A. Nettleton,
Committee.

Mr. Crawford holds over.

Mr. W. A. Nettleton (C. R. I. & P. Ry.): As a member of the Nominating Committee I would like to explain that the nominations of this committee were made entirely in line with the suggestions of our President as to the necessity for a closer relation between the American Railway Association and the Master Car Builders' Association. The nominations, you will note, do not follow the old custom. They may seem to some of you radical, but the necessity for a closer relation with the American Railway Association exists; we all recognize it, and the time is coming, and is practically here, when there can be no intermediate steps between the American Railway Association and the Master Car Builders' Association.

These nominations are made solely with that in view, and there has been no attempt to judge as to the fitness or ability of any man who has, up to now, been in line for promotion, and we hope you will understand our nominations have been so made.

The Association appreciates the work of the members who were in line for office under the old system, but we do not see any other way than to offer this report for your consideration. I am not sure that it will please you all, but it is done with the best intent and kindest feelings for those who have held office and who may have been considered as in line for the Presidency.

On motion, the report was received.

On motion, the meeting then adjourned.

FRIDAY'S SESSION.

The President called the meeting to order at 9 A.M.

THE SECRETARY: Mr. President, at the meeting of the Executive Committee yesterday, the following proposal for associate membership was received:

> We hereby recommend for associate membership in the Master Car Builders' Association, Dr. Charles H. Benjamin, Dean of the School of Engineering, Purdue University.
>
> F. W. BRAZIER,
> WILLIAM FORYSTH,
> GEORGE N. DOW.

The Executive Committee approved of this, and this is a notice that a year from now a vote may be taken on the proposal of Professor Benjamin for membership.

The Executive Committee also considered the following letter:

> PHILADELPHIA, PA., June 10, 1908.
>
> *Mr. J. W. Taylor, Secretary M. C. B. and M. M. Assns.:*
>
> DEAR SIR,— I hereby make application for life membership Master Car Builders' Association, also honorary membership of Master Mechanics' Association. I joined the M. C. B. in 1888, and having been a member of the former twenty years if you will kindly present my name at the coming meetings I will be very thankful to you.
>
> Very truly yours,
> W. H. THOMAS.

The Executive Committee approves of this application for life or honorary membership. A motion to approve its action will be in order.

MR. BRAZIER: I move that the recommendation of the Executive Committee be accepted.

(Motion seconded and carried.)

THE SECRETARY: The Executive Committee also had the following communication:

LIMA, OHIO, June 15, 1908.

Mr. Jos. W. Taylor, Secretary M. C. B. Assn.:

DEAR SIR,— Having joined the M. C. B. Association in 1888 and been a member for twenty years, I ask that you will place my name before the Association to be made a life member and oblige,

Yours respectfully,

C. H. CORY.

The Executive Committee also approves of this application and presents it to the convention for action.

MR. BRAZIER: It is with a great deal of pleasure that I make a motion that the recommendation be accepted and adopted. Mr. Cory, as we all know, was for many years a superintendent of motive power and an active member of this Association, and I believe a man like him will be an honor to it.

(Motion seconded and carried.)

THE SECRETARY: I have the report of the Auditing Committee.

To the Members:

We, the members of the Auditing Committee, have examined the books of the Secretary and Treasurer and find the same correct.

EUGENE CHAMBERLIN,
H. L. TRIMYER,
J. W. FOGG.

MR. BRAZIER: I move that the report be adopted.

(Motion seconded and carried.)

THE SECRETARY: At our session yesterday the question of the date when requirement of Rule 35 of the Rules of Interchange, relating to air-brake hose, should go into effect was referred to the Executive Committee with power to act. The question was considered by the Executive Committee at its meeting yesterday afternoon, and it has fixed the date as June 1, 1909. Rule 35 will be changed accordingly.

THE PRESIDENT: The next in order is the discussion of the report of the special committee on Heating and Ventilating of Passenger Equipment Cars, Mr. S. G. Thomson, chairman.

Mr. Thomson read the report, which is as follows:

REPORT OF THE COMMITTEE ON THE VENTILATING AND HEATING OF COACHES AND SLEEPING CARS.

To the Members:

The work as assigned to your committee on the Ventilating and Heating of Coaches and Sleeping Cars was: "To investigate methods for the regulation of the temperature and the supply of fresh air to passenger cars, with special attention to sleeping cars, and to recommend plans which provide for the regulation of the heat and the air supply by the occupant of each berth."

The principles involved in this subject are so broad, the variations of the conditions so great, and the state of the art so undeveloped, that your committee considered it best to limit its investigation and suggestions to general lines, and not to include any more detail than was necessary to illustrate some of the important principles, and to describe a few of the best methods in use. With this consideration in view, your committee communicated with the men at the heads of the mechanical departments of fifty of the largest railroads in the country, asking for their views on the subject, and for a description outlining the construction and operation of the good heating and ventilating systems and devices with which they were familiar, and which had been tried out sufficiently to show some merit. There was also submitted with this inquiry to these gentlemen, a list of questions which were thought to be pertinent to the subject, and which might serve as texts in bringing out arguments and suggestions along the lines in which it was thought desirable to develop. The result of this inquiry was that thirty replies were received, some of which contained very useful information and suggestions, while others merely consisted of a vote on the questions, without any discussion. Very few of these replies made any mention of new or successful ventilating apparatus in operation on their roads, or in use anywhere with which they were familiar.

Special effort was made to obtain information from the Pullman Company concerning their ventilating experience and their plans for betterments, as well as to have one of their representatives present at a committee meeting; but the Pullman Company did not have anything to present. For this reason the conclusions and recommendations as given in this report, concerning the Pullman equipment, are not based on any definite information or data that have actually been obtained, but rather are formulated from the views of the various railroad officers as expressed in their communications and from the personal views of your committee.

The information which your committee was able to obtain failed to reveal any variety of thoroughly successful ventilating systems which have been extensively tried out, or new devices which are being developed; and the work as outlined seemed to resolve itself into a question of collecting information concerning the few older systems and devices that have been in use, and of developing arguments and ideas concerning new methods, such as any one might wish to propose. It was with this latter thought in view that the ten general questions were evolved and included in the letters of inquiry written to the different railroad officers. These questions were also included in a paper presented by the chairman of your committee to the Western Railway Club at its February meeting.

In 1874 a committee, consisting of Messrs. W. E. Chamberlain of the Boston & Albany R. R., and A. Gleason of the Old Colony Ry., made an admirable report to this Association on the ventilation of passenger cars. The theory and chemistry of ventilation was thoroughly analyzed and presented and many essentials determined which are equally applicable to-day; but at that early date the ventilating systems and devices in use were crude and quite undeveloped.

In 1894 another committee of the Master Car Builders' Association made a report on passenger car ventilation, in which the conditions and devices at the time were discussed, methods presented and suggestions made to meet the various difficulties. This report also included an analysis of the air in sleeping cars, as well as a description of the various kinds of ventilators in use. During the fourteen years since this report was made, there have been many ventilating schemes proposed and some few tried out. Your committee has not included in its report the many auxiliary devices which have been designed and have not progressed beyond the experimental stage; but has limited it to a consideration of the devices and systems that have proven generally useful and that are extensively applied, thinking that more would be accomplished by a presentation and discussion of general principles than by a consideration of the specific details of a miscellaneous lot of experimental devices. Neither did it seem necessary to enumerate all the objectionable features of the present standard methods, and the many difficulties and variable conditions that hem in and restrict an active progress in passenger car ventilation. All are familiar with this phase of the subject, and hence only such difficulties are mentioned as seem necessary in making suggestions and recommendations. It is sufficient to say that every person in a passenger car usually wants a somewhat different condition to exist in regard to the temperature and ventilation, and that this, together with the many limitations, makes the problem an exceedingly difficult one to solve. A number of successive types of car ventilating systems are as follows:

About forty years or more ago, Professor W. Ripley Nichols, of the Massachusetts Institute of Technology, made some investigations of a system in use at that time known as the Winchell Ventilating System. This system was arranged so that air was admitted to the car at the end under the front hood, then allowed to distribute as it would through the car, and to pass out under the rear hood, without any attempt being made to warm it as it entered. Professor Nichols determined that 7,000 to 10,000 cubic feet of air per hour was furnished under favorable conditions. Later experiments with this system at Altoona indicated that 15,000 to 25,000 cubic feet of air per hour was furnished, depending on conditions. It was also found that the movement of air in the car was hardly perceptible when the car was standing still, there being even less air movement with the large openings than is found in many of our more tightly closed modern coaches.

The next type of ventilating system was that found in the early type passenger coaches, known as the Spear Stove System. It consisted of hoods or intakes at diagonal corners of the car, which intakes were connected with the coal stove. The movement of the car forced the air down around the stove and into a box running the length of the car along each side above the floor. From this boxing or duct the warmed air was admitted into the car through various openings in the side of the duct. It then ascended through the body of the car and passed out through the deck sash. This system was a great improvement over any that had thus far been tried, but it was still subject to the following defects: When the car was not moving, the current of warm air was reversed and passed from the car out through the intake. Another trouble was, that the proportion of exits and intakes was not such as to give a balance of pressure between the inside and the outside of the car, and the exits were so much in excess of the intakes that cold air in the winter time would be drawn in around the windows and through every crevice. The trailing deck sash gave rise to various cross-currents, since it was often found that air would enter the car through the deck sash instead of going out, as it should. These cross-currents in the upper deck interfered with the proper burning of the lamps, and did not change the air to any extent as low down in the body of the car as the breathing line. The deck sash also admitted cold draughts, cinders and smoke overhead, to such an extent as to be very annoying. The construction of the deck sash had not been brought up to the higher state of development in which we find it in use to-day on some of the most improved equipment.

The Spear Stove System was modified later by removing the stoves and by substituting for them steam radiator pipes extending the length of the car in the air duct, and by adding ventilators on the upper deck of the car roof. This was an improvement, in that it eliminated the stove and gave an exit for air, other than the deck sash. With some slight modifications, such as the adding of extra radiators at the ends of the car, just inside the doors, this was the type of ventilating system that immediately preceded the modern indirect systems now in use.

The deck sash system, which is now very generally used, was evolved from various former arrangements of deck sash, and its construction has been improved so as to eliminate many of the objectionable features of the former arrangements. The use of wire netting outside of the sash has largely eliminated entering dirt and cinder. This deck sash method of ventilation necessarily separates the heating and ventilating systems, and does not warm the air before it comes into the car. No special air intakes are provided, except the deck sash, and the change of air in the car is limited to the amount that will pass in and out through these openings. When the deck sash is thrown open in the winter time, it very quickly relieves an overheated car, as some of the cold entering air drops into the body of the car to take the place of the heated and vitiated air. This momentary dropping of cold air is effective in relieving a stuffy and overheated car, but continuous draughts created in this way are very objectionable to passengers in cold weather. In the summer time, this dropping of the cool currents is not so pronounced, and the movement of air is not sufficient for good ventilation. This system has been used in the Pullman cars for a long time, but it is now being modified by the application of a late type of the Garland ventilator to the deck sash. This ventilator has eliminated the objectionable down-draughts by creating a strong exhaust, and thus directing all the currents upward and outward through the roof.

The present standard ventilating arrangement of the Pennsylvania R. R. was started in its development more than ten years ago, and is the result of a number of years of study and experimental work. A large number of tests were made, resulting in modifications and changes, each change being followed by runs on the road, and by analyses of air taken from the cars under various conditions. The arrangement, as thus developed, has been gradually applied to cars, until it is now in service on more than one thousand coaches. It embodies some of the most advanced ideas along the line of indirect ventilation and on this account the important features and principles are presented somewhat in detail. The system admits the air through hoods located on diagonal corners of the car. The air passes down a vertical boxing to a horizontal duct under the floor, which duct runs the length of the car between the side and the adjacent intermediate sills. Then the air ascends through slots in the floor to a longitudinal boxing or duct containing steam pipes, extending along the sides of the car, above the floor and immediately over the air duct, thence through galvanized iron tubular pipes under each seat to the aisle, where it ascends and passes out through globe ventilators located over the lamps along the center line of the upper deck.

The system is designed to furnish one thousand cubic feet of fresh air per hour per person, while working normally on a moving train. This figure was based on there being 60 passengers to the car, which would require 60,000 cubic feet of air per car per hour, a complete change of air in the car fifteen times per hour, or once every four minutes. That this amount of air is furnished by the ventilating arrangement, has been proven by numerous tests which were made during its development. Samples of air were taken under various conditions from cars filled with workmen, while the train was running at speed with all the ventilators open; also, while the train was running with all the ventilators closed, as well as while it was standing still with all the ventilators open. The analyses were made by a test for carbonic acid in the air, and the calculations were made by determining the amount of fresh air that it would take to dilute the estimated amount of carbonic acid exhaled by the number of men in the car, so that the air in the car would equal in carbonic acid the amount that was actually found to exist in the samples taken. A representative test made in the winter time under normal conditions, showed by this method of calculation that 62,400 cubic feet of air per car per hour was furnished, while the train was running about 30 miles per hour with all the ventilators open; 27,000 to 37,000 cubic feet of air was furnished while running with all the ventilators closed, and about 23,000 cubic feet while the train was standing with the ventilators open.

The general arrangement and the important details of the Pennsylvania ventilating system are shown by Plates 1, 2 and 3, appended. There are no patented features used, and a description of the essential parts of the system is as follows: 'The intake hoods, vertical and horizontal air ducts, and the heating ducts and pipes, form two independent systems, one extending along each side of the car. These two systems can be operated separately or together. The intake hoods are located at the diagonal corners of the car on the roof close to the upper deck, where they will catch the least amount of dust and cinders, and their openings are covered with fine wire gauze. These hoods contain a flap valve, so arranged that the air has a free passage into the downtake from the direction toward which the car is moving. This flap valve is operated from the inside of the car and must be set for the proper direction by the trainmen. There is a butterfly valve located in the downtake, which is used to exclude foul air and smoke whenever necessary, as, for instance, when going through tunnels. The air passage or duct between the floor and sills of the car is formed by the removal of the cross-bracing in the wooden cars, and by the substitution of iron braces in the form of a trough section. These braces are bolted to the sills and act as efficiently as do the usual wooden ones. This duct contains a hopper for collecting the dirt and cinder, though occasionally it is necessary to remove portions of the false bottom for this purpose. The heating duct, located immediately over the air duct, contains two or more radiator pipes extending the length of the car. The heating surface is sufficient to give one square foot for each 300 cubic feet of air per hour, when the system is operating normally with 60,000 cubic feet of air passing through the car per hour. Steam is received at the middle of the car, flows to the ends, and the condensation is returned to the middle where it is trapped to the track.

The heating duct is connected with the air duct by slots through the floor 2 inches wide and 12 inches long. There is one of these slots between each two seats. The air passes through these slots into the heat duct, and thence through galvanized iron pipes 8 inches in diameter leading to the aisle under each seat. There are seven globe ventilators arranged along the center line of the upper deck, five of them over the lamps and one at each end of the car. The two end ventilators have a register in them, the apertures of which, when open wide, are a little more than equal to the

area of the 6-inch ventilator tube. The closing of these registers shuts off all exit of air through these end ventilators, since there is no smoke bell to provide a constant opening, as is the case with the five combined ventilators over the lamps. The lamp ventilators have a register arranged around a smoke bell 3 inches in diameter extending upwardly into the ventilator. The registers surrounding the smoke bell are operated the same as are those in the two end ventilators, while the smoke bells provide constant openings through the roof equal to about one-fourth of the area of the ventilators over the lamps. The deck sash in the car are tight and immovable, which feature restricts the exit of air entirely to the ventilators, where the proper proportion of opening is maintained.

The temperature, and the movement of air in the different parts of the car, is almost uniform in the winter time when the car is closed, and the currents of air are hardly active enough to be perceptible. Globe ventilators are used on the roof over the saloons at each end of the car, which, in connection with the close balance of pressure maintained in the car body, tend to cause a slight movement of air currents toward the saloons, rather than from them into the body of the car.

The amount of air passing through the car when running at speed is somewhat dependent upon the speed and the direction of the winds, and the apparatus should be regulated accordingly, by the trainmen. The two independent sides of the system depend for their relative efficiency upon the direction of the wind. If the wind is dead ahead, both sides of the system seem to be equally effective, but with the wind ahead and to the right or left, the side from which the wind is coming seems to do the most ventilating. When the train is running with the wind, neither side works quite as efficiently as under the former conditions.

The operation of the system is not entirely dependent on the movement of the car; since, when the car is standing still, the normal circulation of air is maintained by the rising heated currents, when there is heat or light in the car. This natural rising of the warm currents will furnish, under favorable conditions, about one-third of the change of air necessary for a crowded car. When a car is standing at a terminal and there is neither heat nor light in it, which is usually in the summer time, the proper ventilation is not furnished through the ventilating system, but is obtained by keeping the windows and doors open as much as possible.

As a whole, the system is efficient in almost every way when the train is running, but when the train is standing still, the system itself does not provide for any better ventilation than is afforded by the ordinary deck sash arrangement. This can clearly be seen in a smoking car: first, by observing the accumulation of smoke and the stillness of the air when the car is standing at the station awaiting departure with the doors open, and then, after the train starts and the doors are closed, by watching the gradual disappearance of the heavily laden air until the train has attained its speed; at which time the air in the car has become fresh and the car is almost cleared of smoke. The smoke passes from all parts of the car gradually and without showing the presence of cross-currents or draughts, and fresh air is supplied without attracting the attention of the passengers. The circulation and the distribution of air in the car act in the same general way when the train is standing still as when it is running, except that when standing still the air movement is slight, and depends upon the difference of temperature inside and outside of the car; while in the latter case, the air movement caused by this difference of temperature is augmented by the forcing in of the air at the intake and by the induced draught at the ventilators.

The conditions that prevail while a train is standing still are so quickly relieved after it gets into motion that the insufficient amount of ventilation supplied in the former case is comparatively of minor importance. This means that, in any system of day coach ventilation, we have first to consider the condition in which the passengers are kept enclosed for hours at a time during a long trip, and then, after this is made satisfactory, to take care of the local terminal conditions in whatever way seems advisable and in accordance with the necessity. This terminal condition is of more vital concern in the case of sleeping cars which may be in such service as require them to stand in a station during the night for a number of hours before the departure or after the arrival of a train. The only way to solve this difficulty will be to install a forced-draught system on a few cars that could be assigned exclusively to such service as was thought to warrant the extra expense. This would involve the installation of fans, ducts and registers, arranged according to the type of car.

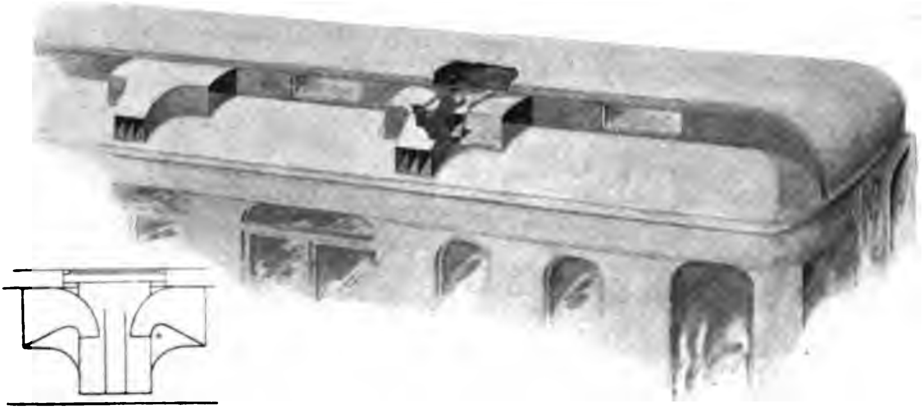
The Pullman ventilating system will be recognized as the direct opposite to the Pennsylvania arrangement as just described, in that the heating and the ventilating systems are separate, and the air is not heated before it enters the car. This deck sash arrangement is used almost universally all over the country, in day coaches as well as in the sleeping cars. Many roads are using the earlier type of drop and trailing deck sash, while others have improved their conditions somewhat by introducing special ventilators, either in place of or in connection with the deck sash, or on top of the upper deck. There has been a tendency during the last few years to use various types of ventilators in the upper deck which induce strong exhaust currents from the car, without providing any intake. This has considerably changed the ventilating conditions in cars equipped with the deck sash system. The former theory was to allow fresh air to enter from above and to drop to the breathing line, while the latter theory is to create a sufficiently strong exhaust from the upper deck to keep the currents always moving upward, and to draw out the vitiated air in sufficient quantities to keep the car well ventilated, allowing the supply to come from wherever it will.

The strong exhaust principle has not been in use a sufficient length of time on coaches and Pullman cars to allow any definite conclusions to be reached in this report concerning its general application to existing equipment; but several ideas occur in this connection which may be worthy of mention. The fact that no special intakes are provided to supply the large amount of air that should be furnished for good ventilation makes it necessary that this quantity of air must be drawn either from the ends of the cars, or in through the cracks around the windows, or down the lamp jacks, if such happen to be open into the body of the car. This condition would be most objectionable in a day coach, as the admission of air through the lamp jacks would interfere with the proper burning of the lights, and it would not change the air to any extent in the lower part of the car near the floor. On the other hand, an admission of any such quantity of air as 60,000 cubic feet per hour through the cracks around the windows and doors, would, if it could be accomplished, create intolerable draughts, and would make the occupation of the seat next to the window very undesirable in cold weather. These strong exhaust ventilators applied to a day coach with its single windows will always set up excessive draughts, even if very much less air is being drawn through the car than is required for good ventilation, and the result necessarily will be a condition of insufficient ventilation, and an excessively draughty car. The question of providing inlets to relieve the window draughts without changing to the indirect system of heating is a difficult matter, for the reason that any admission of untempered air at or near the floor would be just as objectionable as the window draughts, if not more so, since a cold floor is most certainly to be avoided. The strong exhaust principle should not be used as the only means of ventilation in building new coaches or Pullman cars, and should not be carried too far in applying it to existing equipment, without also providing an adequate intake of fresh, warmed air. If the heating system is not modified in the application of the exhaust ventilator to the present equipment, the strong, cold draughts are apt to be more of an objection than the additional amount of air movement is to be an advantage.

The exhaust ventilator with a strong draught, when applied to the Pullman car, has to meet a different condition and has a different effect than when applied to the day coach; since the Pullman cars are more tightly constructed than the coach, and they do not need as much air for good ventilation, on account of the correspondingly smaller number of passengers that can occupy them. The window draughts are reduced to a minimum by the double sash, and the ends of the cars are tightly enclosed. A strong exhaust ventilator arranged to draw from such an enclosed space seems to be a great opposition of forces. Under such conditions, the amount of change of air and the capacity of the ventilators necessarily depends on the amount of air that can be drawn from the ends of the car and through the openings at the windows. Such a partial vacuum created in the car body will doubtless cause a movement of air from the point of least resistance and thus cause an excessive draught at an open window screen or ventilator or vestibule door. In a Pullman car, the point of least resistance to incoming air, when there are no screens in the windows, is apt to be at the ends of the car, and in this fact there lies a danger, since the odors from the smoking room and saloons are liable to be drawn into the body of the car. This only could be prevented by the use of ventilators having a force exhausting directly from these end compartments, greater than the force due to the combined action of all the ventilators in the body of the car. This feature is a more serious consideration in the day coach than in the Pullman car, since the saloons are not so much isolated from the body of the car, and since the additional end door leakage, and the increased opening and closing of the doors by trainmen, are more apt to cause the movement of air to be toward the middle of the car, than from the middle toward the ends. This objectionable movement of air can be controlled by the use of properly located and correctly proportioned ventilators, and the feature is only mentioned as one to be avoided.

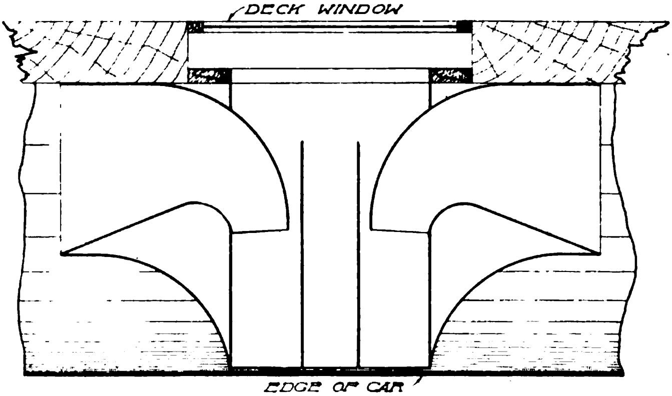
The relation of the strong exhaust ventilator to the heating and ventilating of the Pullman car is a difficult matter to analyze; since the conditions to be met, especially in a sleeping car with the berths made up, are necessarily very complicated. The principal trouble with the sleeping car in the winter time, when the train is moving, has always been to avoid an excess of heat and a lack of ventilation in the lower berths, and a lack of heat and an excess of ventilation in the upper berths. In the summer time, the ventilation of the lower berth is improved somewhat by the use of the window screens, and most of the complaint is due to the conditions when a car is standing at a terminal. The application of the exhaust ventilator to a sleeping car not having special air intakes will not be very effective in relieving the overheated condition of the lower berth in cold weather; but it should improve the heating of the upper berth by drawing a greater proportion of the heat up along the windows and around the upper berth inside the curtains, instead of allowing the most of it to be absorbed in the lower berth, and to pass outside the curtains to the cold aisle and thus escape through the ventilators. The exhaust ventilator also prevents cold draughts from entering the deck sash, which draughts are often so objectionable in the upper berths, and in doing this it should further facilitate the heating, and at the same time it should diminish the excessive ventilation of the upper berth. The ventilation of the lower berths is doubtless improved to some extent by the increased air movement induced behind the curtains by strong exhaust ventilators in the upper deck. This ventilation might be still further improved by connecting a portion of the ventilator to a duct extending down through the walls of the car to the lower berth. It is the opinion of your committee that, as a whole, the general conditions of heating and ventilation of the sleeping car have been improved by the introduction of the strong exhaust ventilators.

The Garland ventilator, as now being applied by the Pullman Company, is shown by Plates IV and V, appended. It is constructed upon the aspirator principle, and its entire function is to draw the air from the



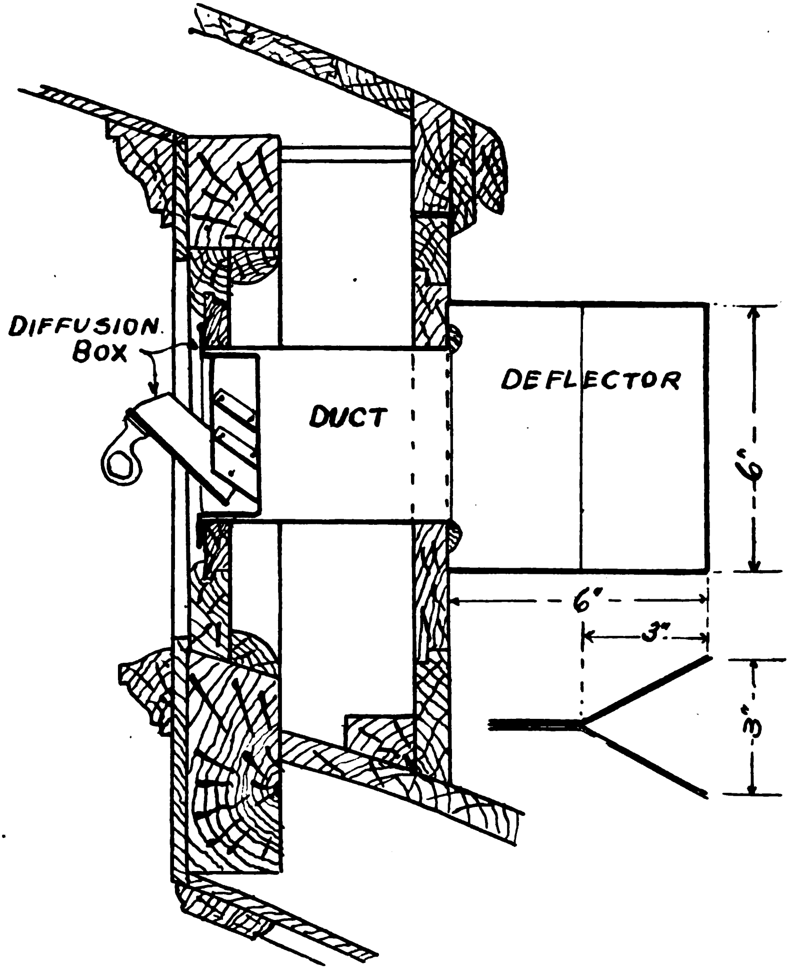
GARLAND VENTILATOR APPLIED TO CAR.

PLATE IV.



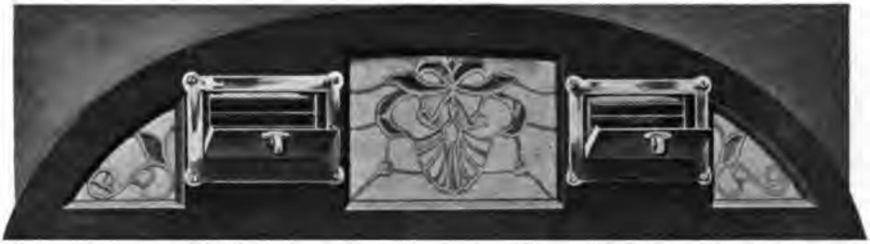
PLAN OF GARLAND CAR VENTILATOR.

PLATE V.

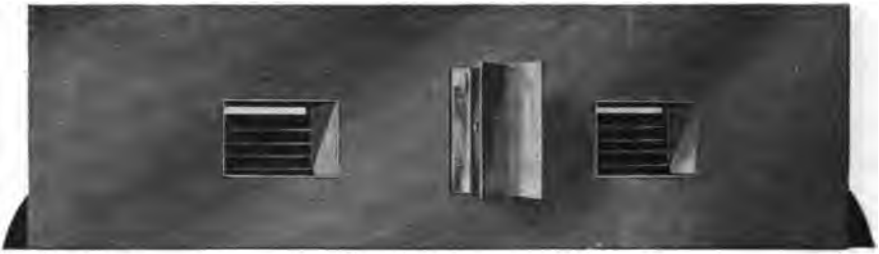


TRANSVERSE CROSS-SECTION OF UPPER DECK OF CAR SHOWING VENTILATOR OF THE AUTOMATIC VENTILATOR CO.

PLATE VI.



Interior View.



Exterior View.

UPPER DECK PANEL OF THE AUTOMATIC VENTILATOR CO.

PLATE VII.

car. The arrangement of the ventilator ducts and the force of the outgoing air largely eliminates the possibility for smoke, cinders and rain to enter the car through the deck, which is a serious objection to the ordinary deck sash arrangement. The addition of the central duct to this ventilator is the latest development in the direction of an increase of its exhausting power. As now constructed it is a simple and efficient exhausting arrangement and a further description in detail is unnecessary. It is thought that a partial vacuum in the car could be created to almost any degree that might seem desirable, by a sufficient application of a device of this sort; but this partial vacuum, in any other than a Pullman car, will in all probability prove to be more of a harm than a benefit. In a sleeping car at night, a strong exhaust seems to be an advantage and may prove to be a necessity as an assistance to an indirect heating and ventilating system.

The Central Railroad of New Jersey uses a ventilating system, which is a modification of the purely exhaust methods as used by the Pullman Company, in that an air intake, as well as an exhaust, is provided by a combination ventilator. This ventilator has been in operation about five years on the above railroad, where it has been developed in connection with the Automatic Ventilator Company. This latter company has patents controlling the use of this device. This automatic ventilator is in service on 400 cars of the Central Railroad of New Jersey, and on 40 cars of the D. L. & W. R. R. Experimental installations and tests have been made on a number of other roads which have installed the device on from one to eight cars. Among these the following roads have made tests which have been presented to your committee: The Wabash R. R., Long Island R. R., Duluth & Iron Range R. R., Chicago, Milwaukee & St. Paul Ry., New York, New Haven & Hartford R. R., Canadian Pacific Ry., Grand Trunk Ry., Interborough Metropolitan Ry.

This ventilator is shown on Plates VI and VII, appended. It is arranged to be substituted for the regular deck sash; or, in cases where it is desired to have an opalescent or other decorative inside sash as a part of the interior finishing of the car, the ventilator can be arranged outside of the sash, and so constructed that the opening of the deck sash will open the ventilator. The device also can be arranged to extend through the car roof, and may be adapted to a car with any design of upper deck. The general arrangement of it is always the same, and consists of two openings or ducts extending into the car, each about 4 by 6 inches in size, with a deflector located between them and extending outwardly at right angles to the panel through which the ducts pass. The proper shutters, screens and other details are provided for controlling the device, and for the exclusion of dirt, cinders and rain. The end of the deflector is bent so as to scoop the air into the forward duct and to exhaust it from the rear duct. Some of the tests show that about 100 cubic feet of air per minute enters the intake side of one ventilator and 116 cubic feet is drawn out of the exhaust side, while running at speed. Tests are now being made to determine the extent that the air is changed in the lower part of the car. These tests involve very careful analysis of air at different heights and in different parts of the car and should show the proportion of air that descends to the passengers as well as the portion that enters one side of a ventilator and is immediately drawn out from the other side of the same ventilator, or from a ventilator in the deck across the car. A considerable difference in temperature between the outgoing and the incoming air, as has been shown by the numerous tests already made, would seem to indicate that an effective circulation is maintained down through the body of the car. A panel ventilator of this kind has been constructed to take the place of a screen in the lower berth of a sleeping car, the thought being that the occupant could manipulate it to admit air to the berth, or to exhaust it from the berth, as he might desire.

The report has thus far included a description of three distinct systems or principles of car ventilation, and, in turn, illustrated them by an outline of three representative types, which have been in service sufficiently long to prove their merits and their failings: the Pennsylvania system, the Pullman or deck sash system, and the Central R. R. of New Jersey system. The first one is a balanced intake and exhaust system in which the air is warmed before it enters, and must pass through the body of the car before it is exhausted. The second is either a combination admission and exhaust deck-sash arrangement, or, in its later developments, is strictly an exhaust system without any special intakes, in which case the air enters wherever it can and is drawn to the upper deck from all parts of the car. The third system is a combination admission and exhaust arrangement located in the upper deck, with a special ventilator arranged to force and to regulate the air circulation. The first system involves the indirect method of heating, while in the other two arrangements the air is heated by radiators after it is in the car. All other arrangements in use are modifications or combinations of these principles, except the forced-draught or fan system.

The Chicago & North-Western Ry. have modified the old Spear Stove System, which was the early form of ventilation used in their coaches, by replacing the stoves with large radiators located immediately inside of the end doors of the car, where, in addition to its function as a ventilating air heater, its radiating effect can be used to counteract the cold blasts from the door. The air for the ventilating system is scooped into the jack on the roof and forced down through the body of the radiator, and then distributed to the car body. So also it will be found that the various other systems embrace portions or combinations of the principles already illustrated; and for this reason it seems unnecessary to describe the many other modifications which may be in use.

With the foregoing description as taken to represent the state of the art, your committee wishes to present a few arguments based on ten general questions involving proposed improvements, and to give their suggestions and conclusions with reference to them.

I. Is it possible to have a satisfactory passenger car ventilating system separated from the heating system; or, in other words, should the air be heated after it is in the car by radiators or by other direct means of heating, or should the indirect method be used in heating the air before it is admitted to the car?

The principal argument in favor of the direct method of heating is that fresh, cold air directly from the outside is more invigorating than it is after the life is taken out of it by passing it over heating pipes. Another argument is that passengers desire to see the deck sash open, and that this in itself makes them think they are getting good ventilation. While there may be some weight to the latter argument, they both seem to be misleading in not making a distinction between the heating and the ventilating of a car. Heating does not mean ventilation, nor does ventilation mean heating; since a stifling hot car may be well ventilated, and since a car kept at exactly the proper temperature may not have any ventilation at all. Most of the complaints made by the traveling public are the results of an improper heating of the cars rather than an insufficient change of air in them; not that the ventilation is less at fault than the heating of the car, but because differences in temperature are much more easily and quickly felt than is a lack of ventilation. The ordinary passenger would not be conscious of bad ventilation until he arrived at the end of a long journey with a dull headache, and even then the lack of fresh air in the car would be the last thing to which he would ascribe his headache if the car had been kept at the proper temperature. The chances are that he would leave the car without any complaint being made, unless very perceptible odors were present, in which case the ventilation condition would be serious, and hardly any amount of open deck sash would give much relief. Thus it will be seen, that the complaints we hear most are on account of a car being too warm or too cold, which is not strictly a ventilation problem, and which complaints would be as liable to be made concerning the temperature of a car equipped with the deck sash as concerning one equipped with the indirect system of admitting the air. In fact, very much more complaint is heard when the air is admitted in a continuous cold draught in the winter than when it is tempered. A passenger can stand a little cold air for a few minutes, as when relieving an overheated car; but when a considerable amount of air is required continuously for any length of time in order to provide the necessary change of air for good ventilation, the committee believes that it must be warmed before it is introduced into the car by some kind of an indirect heating system.

In southern climates, where the winters are mild, the open window is used for the most of the year as a ventilating means, and the method of heating the car is not of such importance as it is in climates where the windows can not be kept open. The trains that run across the hot, dusty plains of the Southwest have another condition to meet, in that the cars must be kept tightly closed nearly all of the time, to exclude the dust, and in the summer time to exclude the heat. Proper ventilation under such conditions is very difficult, but the indirect method should prove most satisfactory for such a service.

It is the opinion of the committee that, for a given amount of air movement through a car, this air can be heated more satisfactorily and with less steam by the indirect method, than it can by the direct method. on account of a better circulation being maintained around the steam pipes by the indirect system; therefore, it would recommend that the indirect method of heating be used for all new equipment, and for such present equipment as it is practicable to change from the direct to the indirect system. For such coach equipment as it is not expedient to change to the indirect system of ventilation, your committee suggests that extended experiments be made with combination admission and exhaust ventilators located in the upper deck.

II. Can the down-draught system as used in buildings be applied satisfactorily to passenger cars by admitting warm air overhead, to become diffused through the car as it gradually cools off and drops to the breathing line and to be removed from the car at the floor?

Many authorities on ventilation claim that the down-draught system is the only one that should be used for buildings, while others state that the warm air should be admitted near the floor through as many openings as possible, and taken out at the ceiling. An argument in favor of the down-draught system, is: that carbonic acid (CO_2), being heavier than air, falls as it is exhaled; also that the breath is exhaled in a downward direction, which assists the falling tendency, and therefore the carbonic acid should be taken out at or near the floor. Another argument is, that the only way to prevent perceptible air currents, is to introduce warm air overhead and allow it to spread uniformly under the ceiling and then to diffuse equally all through the room, rather than to introduce it at the floor and allow it to rise to the breathing line in currents which carry with them dust and microbes from the floor. It is hardly probable that the carbonic acid as exhaled is sufficiently heavy to cause it to fall, since it is usually at 10 to 15 degrees higher temperature than the surrounding air, nor would the addition of about 4 parts of carbonic acid to 10,000 parts of air be likely to counteract the rising tendency of the comparatively large body of air with which it was mixed. However, while this is entirely theoretical, it is the possibilities of actual application that govern, and on this account it is doubtful if the down-draught system could be applied satisfactorily to any type of passenger car. It would be very difficult to apply the various ducts, registers, etc., to the present car construction, and would be almost impossible to maintain the draughts in the normal downward direction. on account of the natural rising warm currents and the various cross-currents, due to loose windows, doors, lamp currents, etc. This would be especially true in single-sash coaches, which are seldom tight against incoming draughts. A forced draught would be necessary in order to keep the currents moving in the proper direction, and even in this case the cold floor would be very undesirable. A downward movement of the air possibly might be maintained without the forced draught, by delivering fresh, warm air to the top of the car at a very much higher temperature than it is desired to maintain at the seat level, and thus compel it to drop as it cools off. This would require a construction sufficiently tight to eliminate all draughts, and would require the incoming air to be at a higher temperature and to be admitted in greater quantities than could be provided by the available methods for heating air in the limited space available in a car. The committee does not recommend the down-draught system of ventilation for any kind of passenger equipment.

III. Do we need a forced-draught system such as might be constructed by electric exhaust fans or blowers, and are the failings of our present system sufficient to warrant this extra expense in any of our passenger equipment?

It is generally conceded that a forced-draught system is not necessary for the usual equipment in regular service. Some few claim that a forced draught is necessary in order to maintain a down-draught system, and also in order to regulate the exact amount of air that passes through a car. The committee does not recommend the down-draught method of ventilation, and believes that a regulating fan in the intakes for controlling the amount of entering air when the train was running would give endless trouble.

With reference to special service equipment, such as dining cars, private cars, and certain sleeping cars, the committee believes that a proper forced draught or blower system is, in some cases, necessary and very desirable, as an addition to the regular methods of ventilating these cars. A sleeping car that stands at a terminal in the summer time from 9 P. M. until after midnight to receive passengers, should certainly have some auxiliary means for forcing ventilation, which could be used until the car leaves on its trip. It should be possible to keep a few cars in this kind of service, and to equip them with a blower or an exhaust fan system that could be used in connection with the ducts of the regular indirect heating and ventilating system of the car. These ducts should lead to each lower berth, and the system might be arranged, either to blow fresh air into the berth or to exhaust the vitiated air from it. The committee does not believe that the fan or blower system would be warranted for all regular equipment, since it would be too expensive to install, and since it could not be maintained in good condition by the ordinary attention that it would receive from the porters and train crews.

IV. Would it be an advantage from a ventilating standpoint to have the car windows arranged to open by dropping, instead of by raising; this arrangement to be used in steel cars, or in such other equipment as it would be possible to provide sufficient clearance in the car side for the dropping windows?

Some claims are made that the dropping window would allow cool, fresh air to be admitted to the car over the heads of the passengers without striking them directly, and that such an arrangement would have somewhat the same good effect as the dropping of a window in a house to allow vitiated or overheated air to pass out. The committee does not believe that this arrangement would be satisfactory for a car window, as, at best, it would be useful only in mild weather, and would be more objectionable than the open deck sash in cold weather. The incoming cold draught might not strike the person sitting next to the window, but, as it would descend in the car, it would be very objectionable to the passengers sitting farther back. A constant opening at the upper part of the window would be too low to give much relief to an overheated car, and it would create undesirable draughts and cross-currents around the heads of the passengers in cold weather. In warm weather the passengers wish to have the window entirely open and the sash out of the line of vision; so that, in this respect, it does not make any difference whether the sash is raised or lowered.

The construction features are greatly against this arrangement; since it would be very difficult to maintain a dropping window sash in a tightly closed position, and would be almost impossible to prevent cinders, rain and dust from entering and settling between the inside and the outside walls of the car. It is altogether probable that a dropping window would be hard for the passenger to operate, and that the general traveling public would not take kindly to an innovation of this kind.

The committee does not think that an open window or deck sash, without auxiliary means for directing or exhausting air through the opening, should be used as a part of the ventilating system of a car, except in warm weather when the average day passenger requires the windows and doors and practically everything to be thrown open. In this case the window becomes the entire means of ventilation. The amount of air that enters a car through an opening not provided with a ventilator of some kind, does not depend so much on the size of the opening and the speed of the car, as it does on the pressure maintained in the car, and on the direction of the wind. If only one window is opened in a car, the pressure is maintained inside, and very little air enters; but if another window is opened near it, or on the opposite side of the car, a very strong draught is immediately set up. This means that the amount of change of air through open windows and deck sash depends largely upon the relative location of the openings, upon the direction of the wind, and upon the creation of a strong draught between the openings. Therefore, any ventilation that is attained by means of plain openings in a car, such as windows and deck sash, is always accompanied by strong cross-currents. Some little air will enter the ordinary deck sash and drop to the floor in the winter, on account of its difference in temperature, but the largest part of the air movement in a car with ordinary deck sash is principally dependent upon the creation of a draught between two or more openings. In the summer time the difference of temperature between the outside and the inside air is not sufficient to cause any perceptible drop of fresh air inside the car, and the air movement through the ordinary open deck sash is almost entirely limited to the cross-currents in the upper deck, caused by the wind and the movement of the train. Thus it will be seen that the windows, whether they are constructed to open downwardly or upwardly, should not be used at all for ventilating a car in cold weather, and that it does not make any difference which way they open in mild weather.

The screen openings in a Pullman car often set up objectionable draughts across a car, even in the summer time; but this is not the case in the sleeping car at night when the berths are made up, since the draughts are effectively broken by the aisle curtains. A dropping window in the lower berth would be a benefit from a ventilation standpoint, and might prove to be a betterment to this equipment, if it were not for the objectionable construction features. The committee does not recommend the dropping window for use in coach or Pullman car equipment.

V. Should a spring-balanced or counter-balanced window or a regulating ventilator be applied to the lower berth of a sleeping car, in such a way that it could be opened and closed in the summer time by the occupant of the berth, and would this be a practicable method of bettering the ventilation in sleeping cars in warm weather?

Some claims are made that the present screen arrangement in the lower berth is good enough, since in any event the porter would usually be asked to make the necessary adjustments before the passenger would retire. This may be true, but the screen arrangement does not allow the occupant to close the window during the night if the berth becomes too cold, or to have a screen inserted if the berth becomes too warm. An easily operated window would place the ventilation of each berth in the control of the occupant. The objection to the balanced window, on the ground that the passengers will not use it on account of inexperience and would call on the porter to make adjustments, would hold true with reference to the few passengers that only travel occasionally, but the committee believes that the greater proportion of sleeping car travelers would be very quick to take advantage of any such means for regulating the ventilation and temperature of the berth. The operation would not be any more difficult than it is to raise or lower the many spring-balanced windows now used in car construction.

Various arrangements for window ventilation might be applied. A rolling screen might be attached to the window so that it would close and open with the window. Another arrangement would be to place the regular screen under one sash, and to have the other sash balanced and the fixtures so arranged that it could be opened or closed to whatever extent the occupant of the berth might desire. Another means of ventilation, and one which would not require the use of a balanced sash, would be to use, instead of the usual screen, a ventilating panel of the "Automatic Ventilator" type, having screened openings which could be used to admit or to exhaust air, and which could be opened or closed at the discretion of the occupant of the berth. A proper manipulation of such a device should give better results than do the plain screen openings as now used. When the berths are made up, the berth curtains close in the space so tightly, that at times very little air enters the berth through the screen. The deflectors of such a ventilating panel would direct air into the berth to any extent that might be desired, and the amount of entering air could be regulated by opening and closing the intake side of the ventilator. On the other hand, if the outer air was too cold, the intake side could be closed altogether and the exhaust side used to draw tempered air through the berth from the aisle; or again, if the weather was mild, the intake and the exit sides both could be used together, to provide a maximum free circulation of air in the berth, if so desired. Very fine screens would necessarily have to be used on the intake side of such a ventilating panel, on account of the extra movement of air into the berth, which would tend to bring in with it an additional amount of cinders and dust. Still another method for ventilating the lower berth would be to extend a short duct through the walls of the car from each lower berth to a ventilator on the roof or under the car located in such a way that one ventilator would be provided for each lower berth or for each two adjacent berths. The openings into the berths might have a register or shutter which could be operated by the occupant, and the ventilators and ducts could be constructed to admit or to exhaust the air or possibly to do both. On the southern and southwestern roads, where, during certain seasons, the windows can not be opened at all on account of the excessive amount of dust and the heat of the external air, the balanced window system or ventilating panel is not so necessary, and the tighter the windows are made the better they will prevent the sifting in of sand and dust. The committee believes, however, that a spring-balanced or counter-balanced window having a double sash, could be constructed in such a way as to exclude cold draughts and entering dust, as well as does the present tight and almost immovable double-sash arrangement.

Your committee recommends that experiments be made with the view of ventilating the lower berth of the sleeping cars, either by means of a balanced window, a ventilating panel, or by a series of ducts and ventilators; such devices to be in addition to the regular heating and ventilating system of the car, and to be used at night when the berths are made up. It further recommends that extended experiment be made with these window and auxiliary arrangements in combination with the strong exhaust ventilators as now used.

VI. Is it practicable to apply to a sleeping car an indirect system of heating and ventilating, having a series of auxiliary ducts leading to each berth, and registers to be operated by the occupant of the berth?

An argument against this method of controlling the ventilation and temperature in a sleeping car berth is: that no system should be used which is not under the entire control of the porter or trainmen, since nearly every passenger has a different idea as to what the temperature and ventilating conditions should be in the car, and since the result that one might be trying to accomplish, another might wish to counteract. Your committee entirely agrees with this argument, when applied to a sleeping car in the day time when the berths are not made up, or to an open chair car or coach; but in the enclosed sleeping car berths at night different conditions exist, since the berths are isolated one from the other and from the aisle, in such a way that the car is really divided into entirely separate compartments which require separate treatment. It is hardly possible for the porter to regulate these enclosed spaces in his effort to keep the body of the car at the proper temperature. It invariably happens that the aisle, and the berths that have not been made up, become so cold that one is compelled to retire in order to escape the draughts, only to find that the berth is very warm and stuffy, and not at all affected by the temperature and the extra ventilation in the aisle.

The light berth curtains now being applied do not isolate the berths so completely from the aisle, and do not make the ventilation of the berth so difficult as did the very heavy curtains formerly used.

There does not seem to be any means except the windows for inducing an air movement of any kind within the lower berth, and the problem is not so much a question of providing heat for the lower berth, as it is to find some way to shut off the heat, and to isolate the heating system from immediate contact with the berth, as well as to find a means for opening and closing an air inlet in the berth or under the berth that will admit an ample supply of properly tempered fresh air from the outside. The closing or boxing up of the heating pipes would largely prevent the absorption of so much of the heat in the lower berth, and would not allow any more heat to be admitted than was required by each occupant. Such an arrangement should include suitable levers or fittings for opening and closing slots or registers in the top of the heater boxing at the ends of each berth. This boxing, except for the register openings, should be closed off entirely from the body of the car, and should have admission openings to the outside air. These outside openings could be in the form of large hoods or scoops located near the ends of the car; or, a number of smaller openings could be arranged along the boxing at intervals, and deflectors used in connection with them to act in scooping in the air. It might prove desirable, in a sleeping car, to provide openings to the outside air without these deflectors or intake hoods, and to rely on a partial vacuum in the car, created by exhaust ventilators, to draw the necessary air through into the heater boxes, and thence through the registers into the body of the car. These openings from the outside, through the heater boxes in the car, would relieve the tendency of the exhaust ventilators to cause cold draughts at the windows, and, as the openings are located under the berth, the induced upward movement of air behind the curtains should provide good ventilation in the lower berth, as well as give the desired amount of heat for both the lower and the upper berths. Such an exhaust action as this, in the summer time, should prove effective in drawing cool, fresh air through the boxing and up through the berths behind the curtains, and, in addition, should relieve the strong draughts through the window screens.

The committee does not believe that it would be practicable to have a system of ducts with registers leading from the lower heater boxing to the upper berths. It would hardly be possible, except by forced draughts, to drive a current of air through such a complicated and crooked duct system, since every angle or turn in a duct increases the resistance, and very greatly reduces the amount of air that will pass through it. For the same reason, a sufficient current could not be drawn through these ducts by exhaust ventilators. Another trouble with such a system of ducts leading to the upper berths would be, that most of the available heated air would naturally rise through them, thus making it difficult to get any heat at all into the lower berth. A better arrangement would be to provide a heating and ventilating register only under the lower berth for the use of the section. An objection might be made to the plan for allowing the one person to regulate the temperature and the ventilation for the entire section; but it is hardly probable that the person below would allow sufficient heat or change of air to pass through the lower berth to make the occupant above as uncomfortable as is now often experienced. The upper and the lower berths are much more closely connected with each other than they are with the aisle or with another section, and the probability is that if the lower berth was regulated by its occupant in such a way as to be made reasonably comfortable by the admission of a liberal amount of warmed air in the winter-time, or cool, fresh air in the summer, there would not be as much complaint concerning the condition of the upper berth as there is under the present conditions.

The committee believes that it is altogether practical to modify the present sleeping car equipment in such a way as to provide, under the ends of each lower berth, an opening for fresh air that can be controlled by the occupant. Such an arrangement might require some additional radiator pipes, and it might prove desirable to carry a branch of the heating duct to the aisle between each berth and the pillow boxes, in order to admit the warm air to the body of the car in the day time. These ducts could have registers in the ends of them, which should be closed at night, since it would not be desirable to lead warm air to the aisle, only to be wasted through the ventilators in the upper deck. The closing of these branch registers at night and the regulating of the registers under the berths by the occupants, would allow all the heat to be retained in the heating system and to be sent along and delivered to the various berths as might be desired. Your committee realizes the difficulties that might be experienced with any ventilating and heating system, in which the exits and entrances for air are thus allowed to be opened and closed promiscuously. However, it does not seem that this opening and closing of the places of admission would alter, to any great extent, the total amount of air that would pass through the car, but would simply facilitate the distribution of it to the parts of the car where it was most desired. It seems, then, that the fundamental requirement for a sleeping car with the berths made up, is an opening under the lower berth for freshly warmed air in the winter and for cool air in the summer, located in such a way as to allow a distinct movement of air and good ventilation behind the berth curtains. Such openings under the berth for fresh air, even without any means of manipulating them by the occupant of the berth, should give much better results than does the present ventilating arrangement of the sleeping car.

Your committee recommends that extended experiments be made, with the view to modifying the existing sleeping car equipment, so as to provide openings under each end of the lower berth; these openings to be controlled by the occupants of the berths, and to be used to admit warmed air in cold weather and cool, fresh air in moderate weather. For new equipment, it further recommends a similar arrangement built into the car and applied in a substantial way, with all the requirements and accessories of a thoroughly complete indirect heating and ventilating system.

VII. Is it necessary to have an elaborate ventilating system in our light electric and suburban equipment; or would the ordinary deck sash system be sufficient for these short trip cars which are thrown open for the exit and entrance of passengers at frequent intervals?

Some claim that there should be as good a ventilating system in light suburban, steam or electric equipment as in any other. The argument is, that these cars usually carry more passengers than any of the other equipment, and therefore, they need as much, if not more, ventilation. This is true as far as the needs of ventilation are concerned; but it is not necessary to provide a large part of this air by the ventilating system, since it is usually furnished by the continued opening and closing of the doors. The crowded street car might be taken as an example in which it would be quite unnecessary to attempt a ventilating system that, in itself, would furnish heated air at the rate of 1,000 cubic feet per person per hour; and, on the other hand, where steam is not available, it would be a very difficult, as well as an expensive proposition, to furnish sufficient electric current to heat such large quantities of air as would be required by the occasional crowds in street cars or in electrically equipped suburban trains. For such light equipment as is only occupied by the passenger for a short time, your committee does not believe that an elaborate system of indirect heating is necessary, but that ample ventilation should be furnished by the use of the ordinary deck sash; or, where the conditions are more exacting, by the use of special ventilators applied to the deck in such a way as to admit and to exhaust sufficiently large quantities of fresh air. In such service as does not involve the frequent throwing open of the doors for the exit and entrance of passengers, which is often the case in the winter on certain suburban railways, the car should have a thoroughly efficient indirect heating and ventilating system, the same as other equipment in long distance service.

VIII. How much air should pass through a car in an hour to furnish good ventilation, and is there any better method for determining such amount than by a test for carbonic acid of samples of air taken from different levels in a car under various conditions?

A well ventilated space, according to the best authorities, is one that may be entered by a person from the outside, without the person being able to detect any of that odor which is characteristic of badly ventilated spaces. There is always a certain small proportion of carbonic acid in any outside air, which many tests have shown to be between 3 and 4 parts in 10,000 parts of air; and it has been found by careful analysis, that it is just possible to detect the characteristic odor mentioned, when the natural 4 parts of carbonic acid in the air has been increased by 2 parts of carbonic acid from human beings. A space, then, is well ventilated when it does not contain more than 6 cubic feet of carbonic acid to 10,000 cubic feet of air. It is thought very undesirable to breathe air containing 7 to 8 parts of carbonic acid, and to be injurious to stay any length of time in a space containing 10 parts of carbonic acid in 10,000 parts of air. In this connection it may be of interest to state that offices often contain 8 parts of carbonic acid, crowded opera houses and meeting halls, 14 to 18 parts, and crowded street cars as high as 22 to 23 parts of carbonic acid in 10,000 parts of air. The tests made by the M. C. B. committee in 1894, show in 10,000 parts of air, 11 to 22 parts of carbonic acid in a sleeping car, 6 to 15 parts in a chair car, and 10 to 21 parts in a suburban coach. These high figures are hardly attained to-day, with the improved ventilating methods and the better attention that these matters now receive.

Tests have proven that the average person, such as rides in our cars, gives off six-tenths of a cubic foot of carbonic acid per hour. Sixty persons in a car would therefore exhale 36 cubic feet of carbonic acid, which amount would require 180,000 cubic feet of fresh air per hour to dilute it so that the air in the car would not contain more than 6 parts of carbonic acid in 10,000 parts of air, the theoretical requirement for good ventilation. This large volume of air equals 3,000 cubic feet of fresh air per person per hour, which amount to your committee seems to be too great to pass through a closed car by any practicable methods.

In solving the car ventilating problem, the amount of air which should pass through a car is usually limited by the amount that can be heated, rather than by the amount as determined by theoretical calculations. The Pennsylvania experiments proved that 90,000 cubic feet of air, or half the theoretical amount, could be passed through the car by the methods used, but that only 60,000 cubic feet of air could be heated properly in zero weather. This amount, therefore, which is equal to 1,000 cubic feet of fresh air per person per hour, or a complete change of air in the car once every four minutes, has been taken as the basis for their system of ventilation. These figures have been accepted by many others as a conservative and very fair basis for good car ventilation; and, since this amount has been found very satisfactory and has stood the test for more than ten years with very little complaint, this figure can be accepted generally as a basis, until a better one is established. At the same time, it may be thought desirable for larger cars and for certain kinds of service, to have a still greater movement of air through the car. This your committee believes can be accomplished with either the direct or indirect systems, by the addition of more hoods or ventilators on the roof and more steam pipes or radiators inside of the car. However, when the good results that have been attained with the present figure are considered, there seems to be a point beyond which it hardly seems necessary to go, both from the standpoint of good ventilation and of economy. It also recommends that a minimum of 1,000 cubic feet of fresh air per person per hour be used as the basis for car ventilation until such a time as another figure can be determined to be a better one.

The carbonic acid test, as mentioned in connection with the Pennsylvania system of ventilating, seems to be about the only accurate way to analyze the various conditions of the air in a passenger car, and your committee recommends the general use of this method.

IX. What is the best method for introducing fresh, warm air into and removing it from a passenger coach and a sleeping car, by the indirect heating system, and at what point should it be admitted and removed?

The best place to admit warm air into a day coach seems from the latest developments to be through pipes, opening at the aisle under each seat. These pipes should connect with a double duct, arranged for distributing and heating the air. The lower duct should provide a free, unrestricted passage for the entering air, so that it is allowed to be distributed along the length of the car at the same time that it is being admitted to the heating duct above it. This allows all the air about an equal contact with the heating pipes, and distributes it effectively throughout the length of the car. If the incoming air was required to travel the length of the car in the duct occupied by the heating pipes, neither the heating of the air nor its distribution in the car would be satisfactory.

When the parts are properly arranged, the speed of the train as well as the wind should force the air into hoods or intakes, located preferably on the roof and at the ends of car, and thence through a boxing to the lower air duct, where it should be divided as it passes through the slotted openings in the floor to the heat duct. The air currents should be divided again as they circulate around the heating pipes and as they pass in opposite directions to the ducts leading to the aisle under each seat. In the experimental stage and during the early development of indirect car ventilation, a continuous slot was cut in the car floor between the air and heat ducts, making practically one duct. This weakened the floor construction of the car, and it was found that the air was not held in contact with the pipes the proper length of time to warm it sufficiently.

This led to the use of the separate slot arrangement which requires the air to come up through the floor at intervals into the heater box, and to divide several times as it passes into the car. Such a division of the air currents and such an amount of contact with radiator pipes having a proper heating service and sufficient steam pressure was found to warm the air satisfactorily in zero weather, with the system acting normally. The ducts which lead the currents to the aisle in a day coach should occupy most of the space under the seats and should be made of galvanized iron so as to act as foot warmers in severe weather. Other means and places for admitting warmed air into the car have been tried. Experiments were made by allowing the heat to pass into the body of the car through registers in the sides of the heating boxes extending along the floor, but this was found to be objectionable to the passengers sitting next to the window. Other experiments were tried with the idea of allowing warm air to come out through the top of the heating boxes and to pass up directly along the windows in order to neutralize their chilling effect; but it was found that these apertures in the top of the heating boxes were receptacles for dirt, and that the currents thus heated and admitted were objectionable to the passengers. Various other arrangements were tried for admitting the air from the air duct into the heating box and from the heating boxes into the body of the car, but none of them were as satisfactory as the arrangements now in use, and which have superseded these early methods.

The removal of air from the car has also been the cause for frequent experiments. Coaches having the indirect system of heating have been fitted up with a large number of ventilators, and also with a comparatively few. It was found with twenty ventilators on a car, that the front ones made more vacuum in the car than could be supplied by the regular intakes at the floor, and that perceptible currents of air were drawn down through the rear ventilators, thus causing the back part of the car to become cold. This difference of temperature at the two ends of the car was eliminated by closing some of the ventilators, which change seemed to prove that the intakes and exits in any system should be very nearly equal in order to obtain the best results. Some cars were fitted up with the ventilators arranged along the center line of the roof over the lamps and with four additional ventilators located between the lamps. These four ventilators were similar to the type without the smoke bell as shown on Plate III, and had registers with apertures about equal to the 6-inch ventilator tubes; but with the six large ventilators between the lamps and the five lamp ventilators, it was found that more air was taken through the car than could be properly warmed in zero weather. This led to the partial closing of the lamp ventilators so that openings 2 inches in diameter were left for the escape of lamp gases. These 2-inch openings resulted in the smoking of the head-lining, and it was soon found that the lamp gases were such an important element in the problem that they would have to be cared for in some better way.

A combination ventilator with a 3-inch smoke bell was designed, and one was placed over each of the five lamps. These five combination ventilators, with a large one at each end of the car, was found to be about the correct arrangement to give the system the proper balance and the required flexibility.

An indirect system of ventilation should have its parts so proportioned that the air will be forced into the car at a slight pressure when the train is running, and the area of the ventilators when wide open in the normal position should be such as will very nearly maintain a balance of pressure between the inside and the outside of the car, and at the same time to allow the proper amount of fresh air to pass through the car. The ventilating registers should be constructed so that they can be partially or altogether closed in very severe weather in order to restrict the normal amount of air that passes through the car. The partial closing of the ventilators would increase the pressure inside of the car and thus further diminish the draughts that enter around the windows and doors. It would also retain the heat in the car without seriously restricting the air movement, as there would always be a constantly maintained exit for air through the smoke bells in the lamp ventilators. Such a restriction of air movement in cold weather would give very good ventilating results when there were few passengers in the car, since the necessary change of air would be much less than is required when the car is crowded. This limiting of the air movement would result in a considerable saving of steam.

The permanent closing of the deck sash is an essential feature of a well balanced indirect ventilating system. It is necessary for the proper movement of air currents, and for the balancing of the pressures inside and outside of the car. This closing of the deck sash permits a cheap deck construction with a neat interior finish, and also prevents cinders and dirt from coming into the car overhead. When the windows and doors of a car thus fitted up with a balanced indirect system are closed tightly in the winter time, there is a normal movement of air, and the amount of it that passes through the car is regulated by the openings of the ventilators and by the pressure at the intakes. The opening of the deck sash or windows or doors, destroys the balance of pressure and sets up various cross-currents, which, in a measure, counteracts the normal working of the ventilating system proper. When the car is thrown open in the summer time, there is no longer much use for a special ventilating system of any kind in a coach, since the open windows furnish fresh air to the passengers in a way that is most acceptable to the majority in mild weather. Many prefer the dust and dirt to the thought of being shut into a tightly closed car.

Small changes in detail affect any closely calculated and well balanced system of heating and ventilation, and each particular design of car requires special treatment to determine the construction and arrangement of the detail parts. Cars of extra length or special construction may require additional ventilators or hoods on the roof to increase the air movement through the car. It is thus seen how intricate and troublesome the ventilating and heating problem is, even in the most simple type of passenger car construction, the day coach. It is therefore impossible to devise a standard set of details, or even the general arrangement of a ventilating and heating system, that will apply to all cars alike. Only broad lines can be followed generally, and the arrangement for each particular case must be worked out separately.

The introduction of the warmed currents into a coach under the seats at the aisle end, is about the only method available that will prevent the currents from coming in direct contact with the passengers. In a sleeping car, auxiliary branches of the heater duct could be brought to the aisle under the seats and between the pillow boxes, for use in the day time, and auxiliary registers could be placed in the main heater boxing under both ends of each berth, for use at night, as described under Question VI. The intake arrangement of any car should dispose of the entering air currents, whether warm or cold, so that they escape the passengers to as great an extent as possible, and so that the heat of warm currents will not become entirely absorbed in the seats or chairs, or in the mattress or bed clothing of the berths. Warm air should be introduced at the floor in all equipment, so that its natural tendency to rise forms the normal ventilating currents of the car. This low admission of the heated air maintains a warm floor, and the rising currents carry away the exhaled impurities from the passengers more effectively than could be done by downward or cross-currents.

The removal of the air from the sleeping cars has already been mentioned in connection with the discussion of the Pullman system and in Question VI. The effect of the strong exhaust in combination with indirect ventilation is outlined and some suggestions made for future experiments.

Your committee recommends that the warmed air from an indirect heating system be introduced at or near the floor for all classes of equipment, and be exhausted at the roof at a less rate than it enters; also, for all new equipment, that separate air and heating ducts, with openings between them and to the outside air, be arranged along the length of the car on each side. It also recommends for existing Pullman equipment, that extended tests be made for the purpose of determining the best methods for providing an ample opening for fresh air to enter through a heater box under the berths and for admitting warmed air from heat ducts into the car.

X. What is the best indirect method for heating the amount of air necessary for the good ventilation of a car, in the limited amount of space available?

Any car can be heated readily, if it is not ventilated. This is economy at the expense of health, since it only requires a very small amount of steam to heat a car, if the air is shut up and not allowed to get out.

Moisture in the air is a very essential element in good ventilation, since even pure air is very objectionable when thoroughly dried out. This moisture is usually furnished in good proportions with the outside air admitted to a car by an indirect heating and ventilating system; but it quickly disappears when the air is retained in a heated car for any length of time. It is easy and cheap to heat confined air, but it becomes a more expensive and a more difficult problem to heat the large quantity of air that must flow through a closed car to furnish good ventilation; or, in other words, to heat the continuous current of fresh air that must be driven through the car and wasted at the ventilators at the rate of 1,000 cubic feet per person per hour. This is health economy at the expense of money, and the price paid may be taken as the extra coal and steam consumption necessary to properly heat this continuous volume of air that passes into the car and out through the ventilators. The volume of air is large and necessarily moves rapidly. This requires a large heating surface and a proper splitting up of the currents as they pass over the steam pipes. No amount of heating surface or steam pressure will be sufficient to heat the car, if the air currents short-circuit around the steam pipes into the car and are not divided and retained long enough in contact with them to absorb the heat. Ventilation would be furnished in any event, but the car would be cold with a high steam pressure in the heating pipes. It is on this account that the mechanical construction of an indirect heating and ventilating system, including the size and arrangement of all the parts, is of much greater importance than is usually supposed. The system may be a success or an utter failure, depending entirely upon the arrangement and the size of the various parts. Thus the necessity will be seen for determining separately, by careful and extended experiments, the details of the heating and ventilating system for each type of car.

It may be found difficult, by the indirect methods, to heat very long cars, and, in severe climates, even the usual sizes and types of our present equipment, in which case it may prove desirable to provide additional radiators inside the cars near the doors or at other convenient locations, to be used in heating air after it is in the car. It is very probable that sufficient air to meet the ventilating requirements could always be partially tempered by the indirect system, in which event the inside radiators would be used to add sufficient heat to this tempered air to make the car comfortable. This additional radiation may prove necessary in cars 70 feet long, and especially in steel cars where considerable heat is liable to be lost by radiation through the parts of the steel construction that extend from the inside to the outside of the car.

The indirect system, as applied to the Pullman car, may require the use of straight steam instead of the hot water system as now used. It is probable that direct steam would be more satisfactory, and more easily regulated in connection with an indirect heating system, than would be the case with the hot water, and that, by such a change to direct steam, additional radiation inside of the car might not be necessary. The Baker heaters may be very desirable and useful in some service, but in the majority of cars they are very seldom used, and the extra expense of this equipment might be saved in many instances by the application of direct steam.

Your committee recommends that the piping, ducts and openings of an indirect heating system be proportioned and arranged in constructing new equipment so as to furnish sufficient warmed air for the required ventilation of the car; and that, in cases where a satisfactory temperature can not thus be maintained in severe weather, auxiliary radiators of sufficient size be located inside of the car near the door, or at some other convenient point.

SUMMARY.

In connection with the various recommendations and suggestions presented in detail in connection with the ten questions some general conclusions are as follows:

A.— An indirect heating and ventilating system should be used in all new equipment, the air being introduced preferably at the floor and exhausted near the roof.

B.—Ample openings for fresh air should be provided under the lower berths of sleeping cars.

C.— A slight excess pressure or balance of pressure should be maintained inside of a car when the windows and doors are closed, in order to exclude incoming draughts at the windows and crevices. This can only be accomplished by driving the air into the car a little faster than it is drawn out, and means that the movement of the air must be made to pass through the car, largely by driving it in, rather than by drawing it out by means of strong exhaust ventilators.

D.— An ideal system would be one in which the pressures were balanced and the amount of air passed through the car was entirely independent of the speed of the train. From this it follows that the most efficient exhausting device is not necessarily the desirable one to use if its size must be so reduced to prevent overpowering the inlet when running at speed, that the car is almost bottle-tight when at rest. In other words, an exhauster which will act efficiently as a chimney as well as an exhauster, is to be preferred to an exhauster alone, however efficient the latter may be.

E.— Exhaust ventilators, designed for the purpose of completely controlling the movement of air in a car, should be used only for existing Pullman equipment, until it is possible to change this equipment to embrace the advantages of the indirect system of heating and ventilating. The best results from a ventilator with a strong exhaust is obtained in the sleeping car at night, at which time, on account of the enclosed berths, it may be found necessary to resort to the strong exhaust method in order to make an indirect heating and ventilating arrangement sufficiently effective.

F.—Sleeping cars in such service as requires the cars to stand at terminals during a considerable portion of the night, should be specially fitted with an auxiliary forced-draught ventilating system, in addition to the regular ventilating system of the car.

G.— Air should be admitted to and exhausted from a car without its being perceptible to the passengers, and it should not pass through the car in decided draughts when the car is closed. The entering currents, therefore, should be admitted so as not to come in direct contact with the passengers.

H.— A minimum of 1,000 cubic feet of fresh air per hour per passenger should be furnished for good ventilation.

I.— Ventilating tests should be accompanied by a test for carbonic acid of air taken from different heights and from different parts of the car.

J.— The thing most desired in the heating and the ventilating of a car, as well as in the keeping of the seats and general interior clean and comfortable, is to shorten the season during which there is a tendency to open the car windows. This season should have a tendency to be shortened as the conditions of heating and ventilation are improved. The later in the spring that there is a desire on the part of the general traveling public to throw open the windows, and the earlier in the fall that there is a tendency to close them, the more comfortable is the closed car, and therefore, the better the conditions of ventilation and cleanliness. This shortening of the open car season, then, may be taken as an indication of development and progress. A clean, comfortable and well ventilated interior will accomplish much in keeping the car closed and in preventing the traveling public from pushing themselves as far outside of the windows as they can. Many travelers always desire to look out of an open window and to sit in the strong draughts, as early and as late in the season as they can; and to do this is most pleasing to all, it is true, when the weather is mild and there is not too much dirt and cinder; but clean and comfortable traveling, as a general proposition throughout the year, can only be accomplished by keeping the windows closed, and it is the closing of the car that makes a ventilating system necessary. The air-handling arrangement then, to perform its function, should maintain a slight pressure inside of a closed car, and always should keep the car full of good, fresh air.

Your committee regrets that its report to your Association is rather in the nature of a paper presenting description and opinions, than a report of conclusions and recommendations based on facts. The scope of the subject is so broad, that it hardly seemed possible, in a limited time, to enter the practical field of research with the view of obtaining actual data concerning the various broad features of the subject. Such work, necessarily, would have been limited to some minute details, and, for this reason, no practical investigations were undertaken. The problems to be solved are so intangible, and the opinions on the various features so diametrically opposite, that the committee decided to use its time in an effort to formulate a description of such practice as was thought to be the best, and to present opinions and arguments concerning what seem to be the vital problems of the car heating and ventilating subject. Many of the opinions given and the conclusions reached may not be of any more value than to suggest other views and methods that may prove to be more nearly correct. The committee has tried to give an opinion concerning the various phases of the subject in accordance with the best light it had, thinking that it was the desire of the Association to stimulate an active interest and a development along this line by bringing forward some solutions, at least for the important problems. Your committee hopes that its interpretation of the work as assigned to it has been correct, and that its report will, in a measure, fulfill the desires of the Association.

The committee acknowledges its indebtedness to the various railroad officers of the country, who have generously responded to its inquiry for suggestions and information; also to the tests and studies of Dr. Chas. B. Dudley, and to the reports on this subject which have formerly been made to this Association, all of which have been a great help in the consideration and presenting of the various problems involved.

S. G. Thomson, Chairman,
B. P. Flory,
T. H. Goodnow,
Committee.

Philadelphia, Pa., May 23, 1908.

The President: Gentlemen, you have heard the report of the committee. What action will you take upon it?

Mr. Brazier: I move that the report of the committee be accepted with the thanks of the Association. While this paper seems rather dry, it is evident that these men have done some hard work, some very interesting work, and I think the thanks of the Association should be tendered to Mr. Thomson and Mr. Flory. As I said last year, the question of ventilation is more of a theory than anything else, but they have certainly done good work and shown us what they think is the best method of ventilating and heating coaches and sleeping cars.

The President: The motion is that the report be received and the thanks of the Association be extended to the committee for their arduous work.

(The motion is carried.)

THE PRESIDENT: The next report is that of the special committee on Protective Coatings for Steel Cars, the Method of Application, and Results of Experiments Made, Mr. G. E. Carson, chairman.

Mr. Carson presented the report as follows:

REPORT OF COMMITTEE ON PROTECTIVE COATINGS FOR STEEL CARS, THE METHOD OF APPLICATION, AND RESULTS OF EXPERIMENTS MADE.

To the Members:

During the past year your committee has worked diligently to ascertain the most satisfactory method in connection with this subject, but has found the field of research so great that it is not possible for us to cover it in one year. We feel free in saying that even two years is hardly sufficient time to make an intelligent report, for the reason that the most capable have been giving this subject much consideration for years past, and yet have not presented anything very definite, and time only will prove the durability of the different mixtures which are used.

Your committee at this time has some few cars under test and it might be of interest to learn the progress we have made, as follows:

One car covered with a coating of crude petroleum oil;

One car painted with special black paint and covered with a coating of good fish oil;

One car painted with special black paint and covered with a coating of locomotive cylinder oil;

One car painted with common paint and covered with equal parts of raw linseed oil and pure glycerin;

One car painted with common paint and covered with Cleanola;

One car painted with common paint and covered with well-rubbed-in Commercial Tallow;

All of the above cars were sprayed on the inside with crude petroleum oil.

Following are our recommendations as far as we have gone:

We are of the opinion that suitable buildings should be provided for the painting of cars, so that the painting of the equipment would not necessarily be confined to certain seasons of the year, for it is essential that your equipment, regardless of the season, be well covered with a protective coating in order to arrest deterioration, which otherwise is very rapid.

In the preparation of the assembled parts of new cars, they should not be exposed to the weather or permitted to rust before their assemblage. In all cases where metal is placed against metal, either riveted or bolted, it should be free from flash or rust and covered with one or two coats of red lead, and the mixture be heavy enough to exclude moisture. But this precaution will avail little unless extra care is taken that all the steel parts fit evenly and are applied in like manner.

After cars are ready for the first coating, it is necessary that all flash and rust be removed. This should be done under rigid inspection. Unless the flash is removed it will invariably fall off inside of one year and continue as long as any remains, regardless of the number of coats of paint applied. We recommend that all flash and rust be removed by sand blast, where possible. Would next recommend dry cleaning (which we do not believe so satisfactory) by using steel scratch brushes, sandstone, or any tools which will answer the purpose; being particular to remove all the dust with suitable brushes or dusters. After following either of these cleanings, we suggest the application of three coats of paint at twenty-four-hour intervals.

In the preparation of cars for repainting, we again recommend cleaning by sand blast, but if this can not be done owing to conditions, then use the dry-cleaning process, as previously mentioned. After the dry cleaning, we would recommend two coats of your standard paint applied at twenty-four-hour intervals.

After we have taken all these precautions to protect the outside of the car, we find that with experiments made in the past, under ordinary conditions it is necessary to repaint at the expiration of three years, and where conditions are unfavorable to the equipment it will be necessary to repaint oftener.

We can not be too emphatic as to the necessity of taking the proper care of the exterior, and regret that we are not able to give the interior the same care.

The best of paint should be used in order to prevent rust after painting, and by using paint which has the greatest wearing elasticity, the less liability there is for the penetration of moisture.

Adhesion is just as important, and to have perfect adhesion, the paint should dry from the inside out, the same as good varnish.

Elasticity must also be considered, for where adhesion is perfect and no elasticity in the materials, we can not hope for good results. For the reason that expansion and contraction of the plates must be provided for, the use of linseed oil or its equivalent, "dehydrated," is preferred.

The painting of the inside of steel cars has been thought by some to be beneficial, but your committee can see no lasting benefits in this, and do not recommend it, but is of the opinion that coating the interior of the cars about once every six months with black oil would act as a preservative.

Further than this we are not able to offer any recommendations, and would, therefore, respectfully ask that your committee be continued for another year in order to determine the results of the tests which we are now making.

G. E. Carson, Chairman,
T. Rumney,
S. A. Cromwell,
Committee.

McKees Rocks, Pa., March 28, 1908.

THE PRESIDENT: Gentlemen, the report is before you, what is your pleasure?

MR. WALSH: I move that the report be received and the committee continued as requested.

(Motion seconded and carried.)

THE PRESIDENT: The next is the report of the special committee on Location of Ends of Running Boards, Mr. E. A. Miller, chairman.

Mr. Miller read the report as follows:

REPORT OF COMMITTEE ON LOCATION OF ENDS OF RUNNING BOARDS.

To the Members:

Your committee on Location of Ends of Running Boards begs leave to report as follows:

During the year past it has accumulated valuable data, and has carried on considerable correspondence with the members. As difficulty has been found in reconciling the diverging views as to the maximum and minimum allowable projection of running boards, your committee recommends that it be continued for another year, to enable us to give the subject further consideration.

E. A. MILLER, Chairman,
T. A. TRELEAVEN,
R. H. PARKS,
F. W. CHAFFEE,
J. COLEMAN,
Committee.

CLEVELAND, OHIO, June 1, 1908.

MR. BRAZIER: I move the report be received.

Motion seconded and carried.

THE PRESIDENT: The next is the report of the Special Committee on Standards for the Protection of Trainmen, Mr. Seley.

Mr. Seley read the report as modified as follows:

REPORT OF SPECIAL COMMITTEE ON STANDARDS FOR THE PROTECTION OF TRAINMEN.

To the Members:

(1) By appointment and instructions of the Executive Committee of the Association, this committee has considered the Standards named in the title of the report and submits the following conclusions and recommendations:

The committee was instructed to propose such changes, additions and amplification of the text and drawings as would make the meaning and intent of the Standards clear and adaptable to all existing types of car equipment, and, as far as possible, to be capable of but one interpretation.

(3) It was recognized that these Standards cover a vast amount of equipment, much of which in regard to type and capacity was hardly thought of when the Standards were first promulgated, and while the subsequent revisions have kept fair pace with the changes in car construction, there has been no general and complete revision. The subject has not had the direct oversight of a standing committee, which we deem desirable and here recommend.

(4) This committee has not lost sight of the broad principles of the protection afforded by the Standards and has endeavored to apply them consistently to all types of cars in use. The changes in the text will be fully explained and no radical changes will be found.

(5) Sheet M. C. B.—19 has been preserved with very little change, and it is followed by detail sheets, one for each car arrangement shown on Sheet M. C. B.—19, each with voluminous notes taken from the text, so that ordinarily the text need not be referred to in seeking information.

(6) Each car arrangement has been given a different letter designation as follows:

Box and other house cars with end ladders	A and B
Box and other house cars with side ladders	C and D
Drop-end gondolas	E and F
Fixed-end gondolas, low side	G and H
Fixed-end gondolas, high side	I and J
Tank cars	K, L and M
Flat cars	N and O
Hopper cars	P

(7) The detail sheets are numbered 19-A, 19-B, etc., each showing the car arrangement indicated by the letter.

(8) The use of the word "grabiron," as used heretofore in the Standards, is considered unnecessary, and it has been omitted in the revision of the text and the drawings, retaining the word "handhold" as inclusive and fully describing the device.

(9) The M. C. B. Dictionary gives a definition and description

of these articles under "grab irons," and under "hand holds" refers the reader to "protection of trainmen," quoting the Standards as they appear in the Proceedings.

(10) Inasmuch as the Safety Appliance Acts refer to the device under both names, there may be criticism with reference to dropping the term "grabiron," but attention is called to the action last year in dropping the word "drawbar," in favor of the word "coupler," while both terms are used in the Safety Appliance Acts.

(11) Another point which has been changed is to more clearly define the length of handholds. In general practice this length is the distance from center to center of holes, but owing to the variety of methods of turning and shaping the ends this length does not indicate the clear length available for the hands. The revision proposed states the clear length, and in most cases the minimum length to be used.

(12) The present Standards state the length of some handholds "to be about 24 inches long," etc., others "from 18 to 24 inches long." It is conceded that absolute measurements are not desirable and that reasonable variations are necessary, but your committee is of the opinion that the intent and purpose of the Standards can best be carried out by the establishment of a minimum dimension which will permit increase rather than an indefinite range either side of a nominal dimension. After examination of a large number of cars, including the later modern types as well as the older ones, it was decided that a proper minimum length that would serve all purposes as to safety, utility, and convenience, as well as the necessities, when used both as a handhold and foothold, is 16 inches clear length. When used only as a handhold and not as a foothold, a shorter length is permissible, and for such handholds we deem 12 inches a safe and convenient minimum length.

(13) These dimensions have, therefore, been generally used in the proposed revision, it being understood, however, not to discourage the use of, or to change on present equipment, any handholds exceeding 16 inches clear length.

(14) No maximum length of handholds is given, this being deemed unnecessary, but it is the thought of the committee that handholds that are used as ladders which much exceed a length of 24 inches should be increased in diameter.

(15) Examinations of cars also disclosed the fact that on many low side gondolas, both drop and fixed ends, and some hopper cars, there is not sufficient total depth of sill and side to apply a vertical handhold of 16 inches clear length, and the stakes for the proper attachment of sides of these cars and also on flat cars to retain lading make it equally difficult to apply a full-length horizontal handhold. In most cases the vertical arrangement is preferable but impossible, account of limited depth available.

(16) In order not to enforce a condition impossible to fulfill and

obtain the maximum length of handhold which can be applied over the steps on these cars, it was decided to require as much clear length as the car construction would permit, believing that this will give the necessary latitude to meet existing conditions, yet provide satisfactory handholds.

(17) Another reason for conceding the necessity for these handholds to be shorter than the standards required for other handholds is the fact that they are not used for footholds.

(18) We have also modified the requirements governing the height of side and end handholds. The general requirement for height on all cars except flat cars was to have side handholds not less than 18 inches nor more than 30 inches above the center line of coupler. End handholds, unless on flat cars, drop-end gondolas, etc., were also covered by the same dimensions.

(19) This range of height of side handholds has been retained on cars having a considerable height of superstructure, but the upper limit only has been retained on low side gondolas, hoppers, etc. It was found impossible to comply with the 18-inch minimum height on many low-side cars of various types, and it has, therefore, been omitted.

(20) It has been omitted entirely with reference to the height of end handholds on all cars. The purposes for which these are now used are better served by the lower locations, and we have named the under side and face of the end sills as the preferred locations, the coupler unlocking rod being also available as an end handhold.

(21) Caboose cars have been added as coming under freight train car requirements. Passenger train cars have been separately covered and will be found directly following the freight Standards.

(22) The Master Car Builders' Dictionary has been used as the authority for defining the use and the proper names of appliances used in connection with these Standards.

(23) For convenience of comparison, the present Standards for Protection of Trainmen are reproduced as follows (see pages 582 to 585, Proc. 1907), with paragraphs numbered for convenient reference.

PROTECTION OF TRAINMEN.

Sheet M. C. B. 19.

1. In 1893 a Recommended Practice was adopted to protect trainmen from accident, under the subheads as given. In 1896 some changes were made, especially in regard to handholds, and by the elimination of various details from drawing. In 1902 it was changed to Standard.

2. In 1905 Sheet M. C. B. 19 was revised to more clearly define the location of safety appliances on cars. Also, the lower round of the end ladder with wooden rails was made straight instead of having an offset.

3. In 1906 the position of the brake shaft and location of roof handholds were modified.— Proceedings, 1906.

4. In 1907 Sheet 19 was devoted entirely to illustrating these Standards.

Position of Brake Shafts.

5. The brake shaft to be preferably placed on what is the left-hand corner of the car when a person is standing on the track facing the end of the car. The ratchet wheel to be fastened to the brake shaft and brake pawl to be fastened to a suitable casting attached to the roof, or attached to the brake shelf. The center of the brake shaft to be about 20 inches from the middle of the car.

6. See Proceedings 1888, pages 25 and 123; Proceedings 1893, 1896 and 1907.

Running Boards.

7. The ends of the running boards of box cars to be made to project over the ends of the cars, and properly supported. The running board shall be made not less than 18 inches wide.

8. See Proceedings 1888, pages 24 and 123; Proceedings, 1893, 1896 and 1907.

Steps.

9. Two good substantial steps, to be made of wrought iron, about ½ by 1½ inches section, to be fastened, one to each side sill, next to the corner of the car to which the ladder is attached on cars having ladders, or on what is the left-hand corner of car when a person is standing on the track facing end of car on all other cars. The steps to be about 12 inches long, measured horizontally between the sides, and the tread to be about 8 inches below the bottom of the sill. The side of the step next to the corner of the car to be as near to the end of the car as is practicable. Each side of the step to be fastened to the sill with two ½-inch bolts and nuts, or two rivets, not less than ½ inch in diameter.

10. See Proceedings 1888, pages 25 and 121; 1893, 1902 and 1907.

Ladders.

11. Each box and stock car should have two iron or wooden ladders with not less than five steps to each ladder; steps, if of iron, to be not less than ⅝ inch diameter; if of wood, to be not less than 1½ by 2 inches, and to be made of hardwood; the steps to be not less than 2½ inches from side or end of car. Each car to have a handhold on roof directly over the ladder and running parallel with the side or end of car on which the ladder is located; these handholds to be placed not less than 2 inches nor more than 18 inches from the edge of the car and of a length suitable to the construction of the car. When iron ladders are used and placed on ends

of car, the bottom step to have a guard or projection to prevent men from slipping when swinging around the end of car to get on the step.

12. Proceedings 1902, 1906 and 1907.

Handholds.

13. Box and stock cars constructed with projecting end sills with end ladders should be provided with a horizontal grabiron or handhold about 24 inches long on side of car over each step, located not less than 18 inches nor over 30 inches above center line of coupler. The end ladder should be located on left-hand side of end of car and one horizontal grabiron or handhold, about 24 inches long, on right-hand side of end of car not less than 18 inches nor over 30 inches above center line of coupler, the lower rung of ladder being a suitable grabiron for opposite side of end of car, as shown on Fig. A 1, Sheet M. C. B. 19.

14. Box and stock cars constructed with projecting end sills with side ladders located over steps, the lower rung of such ladders is an effective grab. They should also be provided with two horizontal end grabirons or handholds, about 24 inches long, located on each side of end of car not less than 18 inches nor over 30 inches above the center line of coupler, as shown on Fig. A 2, Sheet M. C. B. 19.

15. Box and stock cars not constructed with projecting end sills, and which have end ladders, should be provided with horizontal grabiron or handhold about 24 inches long on side of car over each step, located not less than 18 inches nor over 30 inches above center line of coupler. The end ladder should be located on left-hand side of end of car and one horizontal grabiron or handhold about 24 inches long on right-hand side of end of car not less than 18 inches nor over 30 inches above center line of coupler, the lower rung of ladder being a suitable grab for that side of end of car, as shown on Fig. A 3, Sheet M. C. B. 19. End ladders constructed without side frames should have the lower rung provided with a guard to prevent the foot from slipping off.

16. On box and stock cars not constructed with projecting end sills, and which have side ladders located over steps, the lower rung of such ladder is an effective grab. They should also be provided with two horizontal grabirons or handholds, about 24 inches long, located on each side of the end of car not less than 18 inches nor over 30 inches above center line of coupler, as shown on Fig. A 4, Sheet M. C. B. 19.

17. All other classes of house cars, such as refrigerators, furniture cars, etc., if constructed with projecting end sills, are to have ladders, sill steps and handholds as described for box and stock cars, and as shown in Figs. A 1 and A 2. If not constructed with projecting end sills, they are to have ladders, sill steps and handholds, as described for box and stock cars, and as shown in Figs. A 3 and A 4, Sheet M. C. B. 19.

18. All gondolas with drop ends to be provided with horizontal grabirons or handholds on sides of car over each step, about 24 inches long, located as high as possible, but not less than 18 inches nor more than 30 inches above center line of coupler, or with vertical grabiron or handhold over steps on the sides of car about 24 inches long, the lower end to be placed about six inches above the floor of the car, and two grabirons or handholds placed under the sill at the end of car as near the face as will insure a good safe fastening, the outside end of it to be in line with the inside face of the side sill, and to be about 18 inches long, with a space not less than two inches nor more than three inches between it and the end sill, as shown on Fig. A 5, Sheet M. C. B. 19. If preferred, the end handholds may be placed on the face of the end sill, as shown in the alternate illustration, A 5, Sheet M. C. B. 19.

19 All fixed-end gondolas should be equipped with a vertical grabiron or handhold over steps on the sides of the car, about 24 inches long, the lower end to be placed about 6 inches above the floor of the car, or with a suitable number of horizontal grabirons or handholds about 24 inches long over each step, and two horizontal grabirons or handholds on each end of car, about 24 inches long, about 4 inches from the outside of car and not less than 18 inches nor over 30 inches above center line of coupler; exception to be made where the car is provided with a brake step, in which case the bracket of the brake step can be used as a grabiron on that side of end of car, as shown on Fig. A 6, Sheet M. C. B. 19. It is also recommended that when the side of a gondola car is too high for a man standing on the step to reach the top, there should be one additional vertical grabiron or handhold placed on left side of end of car, extending from within 4 inches of the top, to be about 18 inches long, as shown on Fig. A 6, Sheet M. C. B. 19.

20. Tank cars should be provided with horizontal grabirons or handholds, about 24 inches long, on sides over steps; cars provided with safety railings on sides do not require side grabirons or handholds, but all cars should be provided with two end grabirons or handholds, about 18 inches long, located on under side of end sill, the same as for drop-end gondolas, and as shown on Fig. A 7, Sheet M. C. B. 19. If preferred, the end handholds may be placed on the face of the end sill, as shown in the alternate illustration, Fig A 7, Sheet M. C. B. 19.

21. All flat cars to be provided with horizontal grabirons or handholds about 24 inches long, over steps near end of cars where coupler unlocking rod is located, and two end grabirons or handholds about 18 inches long, placed under the sill as near the face as will insure a good safe fastening, the same as for drop-end gondolas, and as shown on Fig. A 8, Sheet M. C. B. 19. If preferred, the end handholds may be placed on the face of the end sill, as shown in the alternate illustration, Fig. A 8.

22. Cars of other types of construction not covered specifically in foregoing paragraphs of this section and not shown by the drawings on

Sheet M. C. B. 19, may be deemed of special construction, but shall have the complement of grabirons or handholds, steps and ladders, as is required for cars of the nearest approximate type, and such handholds shall be considered as required by the rules of interchange.

23. It is also recommended that all grabirons or handholds applied on wood shall be secured by through bolts of ½ inch diameter, with nuts on the outside and riveted over wherever it is possible to do so, and where lag screws are used they shall not be less than ½ inch diameter and 3 inches long, and screwed into solid wood.

24. Rivets not less than ½ inch diameter may be used when grabirons or handholds are applied on steel cars.

25. All handholds should have a clearance behind them of not more than three inches nor less than two inches.

26. All handholds should be made of iron not less than ⅝ inch diameter; handholds on the sides and ends of cars should be about 24 inches long in the clear, except end sill handholds, which may be from 18 to 24 inches long, provided, also, that the coupler unlocking rod, if properly located and having not more than three inches nor less than two inches clearance between it and the car, will be a suitable end sill grabiron or handhold.

27. See Proceedings 1879, pages 109, 110 and 111; Proceedings 1893; Proceedings 1894; Proceedings 1896; Proceedings 1902; Proceedings 1907.

(25) The revision proposed by this committee is printed at the end of this report, arranged as we would suggest as to headings, paragraphs, and marginal references.

(26) The first change is in the title, and made to show that these Standards are for Freight Train Cars. The list of drawings is made to include the new detail sheets.

(27) The introduction, paragraphs 1 to 4, are unchanged; paragraph 5 is to cover this year's work and a general marginal reference has been added.

(28) *Position of Brake Shafts.* The heading has been changed to *Brake Shafts* as more generally covering the contents of the section. Paragraph 1 defines the location in perhaps better language than formerly.

(29) In order to cover various methods of attachment of ratchet wheels, the term "fastened" has been changed to "secured from turning," and ratchet wheels made the subject of paragraph 2.

(30) The fastening of the brake pawl was not clearly stated, and in order to require a suitable method of attachment the brake pawl is covered by paragraph 3.

(31) The distance of about 20 inches from the center line of the car for brake staff location is deemed correct for cars with fixed ends and is so covered in paragraph 4.

(32) On many drop-end gondolas, ballast cars, flats for long lading, etc., the 20-inch distance can not be maintained, and this class of cars is covered by paragraph 5.

(33) Your committee has decided that it is unnecessary to reproduce the cut at the bottom of present Sheet M. C. B. 19, showing Position of Brake Staff, etc. The brake staff is now shown on each of the cars illustrated, and the other information is embraced in the voluminous notes on the detail sheets, so that the drawing in question is unnecessary, and it has been omitted.

(34) The section on *Running Boards* now covers the width to be used on box and other house cars in paragraph 1 and on tank cars in paragraph 2. Paragraph 3 makes the projection of running boards over the ends of cars optional, inasmuch as no definite amount is standard. This committee's action was formed by the fact that a special committee has this matter in hand with instructions to report to this convention.

(35) The section on *Steps* presents a number of interesting changes. Paragraph 1 states very clearly and concisely the number and location of the steps, cutting out what seems to be useless and superfluous language. Paragraph 1 under Brake Shafts, and also the present paragraph plainly state that the position is as observed externally to the car, and we deem these references sufficient as regards the point of view for any further right- or left-hand references.

(36) Paragraph 2 includes steel as a proper material, and gives the size of material for steps as at present, and also permits the use of other sizes and shapes of equivalent area of cross section.

(37) Paragraph 3 gives the length of steps as at present, adding how the measurement should be taken.

(38) Paragraph 4 is recommended instead of the present requirement of having tread of step about 8 inches below bottom of sill. Owing to the variety of depths of side sills due to various types and methods of car construction, a close compliance with the 8-inch depth would result in all kinds of heights from the rail. It is deemed desirable to limit this variation and to provide a fixed point as a basis of measurement, hence the choice of the rail and the preferred distance of 24 inches and a maximum distance of 32 inches therefrom. In order that the clear opening above treads may not be improperly obstructed by nuts, beveled washers, etc., a clear depth has been specified.

(39) The adoption of the above height would result in some very deep steps on some types of cars and extra treads, and lateral bracing for such steps is provided in paragraph 5.

(40) Paragraph 6, regarding fastenings, retains the present standard as regards steps secured with ½-inch bolts. The very extensive and successful use of the framing rods as step fastenings and the difficulty of obtaining a second bolt due to the very common use of metal post pockets has determined the committee to authorize the use of one bolt or one rivet per side as a fastening for steps, when bolts or rivets not less than ⅝-inch diameter are used.

(41) Under the heading of *Ladders* the first paragraph is practically a definition of a high-side open car and for which ladders should be provided as well as for box and other house cars.

(42) Paragraph 2 states concisely their location, the point of view being external to the car.

(43) Paragraph 3 adds steel as a material, and states the dimensions in nominal terms instead of an exact minimum dimension which makes no allowance for reasonable wear and tear.

(44) Paragraph 4 covers spacing, and paragraph 5 clearance; the latter now being expressed as the amount "around" ladder tread or handhold which would cover, "back of," "distance from," "behind them," and such various terms formerly used to describe the distance between the body of the ladder tread or handhold and the nearest surface, whether above, below or back of the ladder tread or handhold.

(45) Paragraph 8 covers the foot guard, omitting unnecessary language. Ladders on tank cars to reach high running boards are specified in paragraph 7.

(46) Under the heading of *Handholds* the first two paragraphs cover the location of roof handholds which were formerly included under Ladders. The expression "directly over" has been changed to "in line with," as the former expression could not be literally complied with.

(47) The two paragraphs covering cars with end ladders (13 and 15) and with side ladders (14 and 16) have each been consolidated, omitting reference to projecting or non-projecting end sills as having no bearing on the subject of handhold application.

(48) The words at the beginning of each of these paragraphs (13 to 16) "Box and stock cars" has been changed to "Box and other house cars," making paragraph 17 unnecessary, and it has been omitted.

(49) Referring to the new form of report, under *Handholds,* roof handholds are covered in paragraphs 1 and 2; cars with end ladders are then treated in paragraph 3 as to their side handholds; paragraph 4, end handholds; paragraph 5, the drawing references.

(50) The present drawings have been retained, although the matter of having but one drawing each for end and for side ladder cars was discussed, but as it seems desirable to show both wood and iron ladders, the final decision was to retain the four views of house cars shown in present Standards on Sheet M. C. B. 19.

(51) Cars with end ladders are covered in paragraphs 6, 7 and 8, with same order of arrangement as the preceding type.

(52) Gondolas with drop ends; paragraph 18 of present Standards. has been covered by paragraphs 9 to 13 inclusive in the revision, divided as follows: 9 and 10, side handholds; 11 and 12, end handholds and drawing references; 13, the use of the coupler unlocking rod.

(53) Gondolas with fixed ends; paragraph 19 of present Standards. are covered by the following paragraphs: 14 and 15, side handholds; 16, top end handholds; 17, side handholds, high cars; 18, end handholds; 19, brake step brackets as handholds; 20, 21 and 22, drawing references.

(54) Tank cars; paragraph 20 of present Standards, are covered by following paragraphs: 23 and 24 define the general requirements for safety railings and tank head handholds; 25, side handholds; 26, safety railings as side handholds; 27, 28, 29, 30 and 31, end handholds and drawing references.

(55) Flat cars; paragraph 21 of present Standards, are covered by following paragraphs: 32, side handholds; 33 and 34, end handholds and drawing references.

(56) The hopper car arrangement is shown in Fig. A-9, Sheet M. C. B. 19, but it is not described in the text of present Standards. It is now proposed to cover this type of car by the following paragraphs: 36 and 37, side handholds; 38 and 39, top end handholds or ladders; 40, end handholds; 41, brake-step bracket as end handhold; 42, drawing references.

(57) Caboose cars are next considered. These are new Standards and have been very carefully framed, and are included in paragraphs 43 to 48.

(58) Paragraph 22 of present Standards, referring to cars of special construction, has been incorporated as paragraph 49 in the new form, revised somewhat as to language.

Clearance.

(5) All ladder treads shall have a minimum clearance around them of 2 inches, nominal clearance 2½ inches.

Footguard.

(6) When wrought iron or steel ladders are placed on ends of cars with non-projecting end sills, the bottom treads to have a guard or upward projection at inside ends.

Tank-car ladders.

(7) Tank cars having running boards to be provided with suitable ladders to give access to the running boards; the ladders to be located on right-hand end of sides of cars or left-hand side of ends of cars when running boards are continuous around the car. If running boards are not continuous, ladders to be so located as to give access to each end of each running board. Treads of ladders to be spaced about 18 inches apart.

Drawing reference.

(8) Arrangements of ladders are shown on Sheet M. C. B. 19, Figs. A, B, C and D, and on detail Sheets M. C. B. 19-A, 19-B, 19-C and 19-D.

References.

(9) See Proceedings 1902, 1906, 1907 and 1908.

Handholds.

HANDHOLDS.

Roof handholds.

(1) Box and other house cars shall have handholds on roofs, in line with each ladder, running parallel with the ladder treads.

(2) Roof handholds to be placed not less than 2 inches nor more than 18 inches from the edge of the roof and be not less than 12 inches and preferably 16 inches in the clear, unless the construction of the car will not permit.

Box, etc. Side handholds.

(3) *Box and other house cars with end ladders* to be provided with a horizontal handhold, 16 inches in the clear or longer, on each side of each car over sill step; located not less than 18 inches nor over 30 inches above center line of coupler; and

End handholds.

(4) Each end of car to be provided with two horizontal handholds, not less than 12 inches and preferably 16 inches in the clear or longer, located not over 30 inches above center line of coupler, preferably on the end sill; the coupler unlocking rod or a tread of ladder, when properly located and having proper clearance around it is a suitable end handhold.

Drawing reference.

(5) Arrangement of handholds is shown on Sheet M. C. B. 19, Figs. A and B, and on detail Sheets M. C. B. 19-A and 19-B.

Box, etc. Side handholds.

(6) *Box and other house cars having side ladders* located over sill steps, a tread of such ladder, not over 30 inches above center line of coupler is an effective handhold. Ladder treads to be about 16 inches clear length.

End handholds.

(7) Each end of car to be provided with two horizontal handholds, not less than 12 inches and preferably 16 inches in the clear or longer, located not over 30 inches above center line of coupler, preferably on the end sill; the coupler unlocking rod, when properly located and having proper clearance around it is a suitable end handhold.

Drawing reference.

(8) Arrangement of handholds is as shown on Sheet M. C. B. 19, Figs. C and D, and on detail Sheets M. C. B. 19-C and 19-D.

Gondola cars drop ends. Side handholds.

(9) *Gondola cars with drop ends* to be provided with a horizontal or vertical handhold on each side of each car over sill steps, with as much clear length as the car construction will permit, provided same need not exceed 16 inches; and

(10) If horizontal side handholds are used they shall be located not more than 30 inches above center line of coupler.

End handholds.

(11) Gondola cars with drop ends to be provided with two end handholds not less than 12 inches and preferably 16 inches in the clear or longer, at each end of car, placed under the end sills as near the face as will insure a good safe fastening, and as shown on Fig. E, Sheet M. C. B. 19, detail Sheet M. C. B. 19-E; or,

Drawing reference.

(12) If preferred, the end handholds may be placed on the face of end sills, as shown on the alternate illustration, Fig. F, Sheet M. C. B. 19, detail Sheet M. C. B. 19-F.

(13) The coupler unlocking rod when properly located and having proper clearance around it under all conditions, including projecting loads, will be a suitable end handhold.

Gondola cars. Fixed ends. Side handholds.

(14) *Gondola cars with fixed ends* to be provided with a horizontal or vertical handhold, on each side of each car over sill steps, with as much clear length as car construction will permit, provided handholds need not exceed 16 inches in length; and

(15) If horizontal handholds are used they shall be located not more than 30 inches above center line of coupler.

Top-end handholds.

(16) Gondola cars without projecting end sills, having ladders located on sides, to have one vertical or horizontal handhold at upper corner of left-hand side of brake end of car.

Side handholds high cars.

(17) Vertical handhold to extend downward from about 4 inches from top of car; horizontal handhold located about 4 inches from top of car.

End handholds.

(18) Each end of each car to be provided with two horizontal handholds not less than 12 inches and preferably 16 inches in the clear or longer, located not over 30 inches above the center line of coupler, preferably on the end sill; the coupler unlocking rod when properly located and having proper clearance around it is a suitable end handhold.

Clearance. (5) All ladder treads shall have a minimum clearance around them of 2 inches, nominal clearance 2½ inches.

Footguard. (6) When wrought iron or steel ladders are placed on ends of cars with non-projecting end sills, the bottom treads to have a guard or upward projection at inside ends.

Tank-car ladders. (7) Tank cars having running boards to be provided with suitable ladders to give access to the running boards; the ladders to be located on right-hand end of sides of cars or left-hand side of ends of cars when running boards are continuous around the car. If running boards are not continuous, ladders to be so located as to give access to each end of each running board. Treads of ladders to be spaced about 18 inches apart.

Drawing reference. (8) Arrangements of ladders are shown on Sheet M. C. B. 19, Figs. A, B, C and D, and on detail Sheets M. C. B. 19-A, 19-B, 19-C and 19-D.

References. (9) See Proceedings 1902, 1906, 1907 and 1908.

Handholds.

HANDHOLDS.

Roof handholds. (1) Box and other house cars shall have handholds on roofs, in line with each ladder, running parallel with the ladder treads.

(2) Roof handholds to be placed not less than 2 inches nor more than 18 inches from the edge of the roof and be not less than 12 inches and preferably 16 inches in the clear, unless the construction of the car will not permit.

Box, etc. Side handholds. (3) *Box and other house cars with end ladders* to be provided with a horizontal handhold, 16 inches in the clear or longer, on each side of each car over sill step; located not less than 18 inches nor over 30 inches above center line of coupler; and

End handholds. (4) Each end of car to be provided with two horizontal handholds, not less than 12 inches and preferably 16 inches in the clear or longer, located not over 30 inches above center line of coupler, preferably on the end sill; the coupler unlocking rod or a tread of ladder, when properly located and having proper clearance around it is a suitable end handhold.

Drawing reference. (5) Arrangement of handholds is shown on Sheet M. C. B. 19, Figs. A and B, and on detail Sheets M. C. B. 19-A and 19-B.

Box, etc. Side handholds. (6) *Box and other house cars having side ladders* located over sill steps, a tread of such ladder, not over 30 inches above center line of coupler is an effective handhold. Ladder treads to be about 16 inches clear length.

End handholds (7) Each end of car to be provided with two horizontal handholds, not less than 12 inches and preferably 16 inches in the clear or longer, located not over 30 inches above center line of coupler, preferably on the end sill; the coupler unlocking rod, when properly located and having proper clearance around it is a suitable end handhold.

(8) Arrangement of handholds is as shown on Sheet M. C. B. 19, Figs. C and D, and on detail Sheets M. C. B. 19-C and 19-D. **Drawing reference.**

(9) *Gondola cars with drop ends* to be provided with a horizontal or vertical handhold on each side of each car over sill steps, with as much clear length as the car construction will permit, provided same need not exceed 16 inches; and **Gondola cars drop ends. Side handholds.**

(10) If horizontal side handholds are used they shall be located not more than 30 inches above center line of coupler.

(11) Gondola cars with drop ends to be provided with two end handholds not less than 12 inches and preferably 16 inches in the clear or longer, at each end of car, placed under the end sills as near the face as will insure a good safe fastening, and as shown on Fig. E, Sheet M. C. B. 19, detail Sheet M. C. B. 19-E; or, **End handholds.**

(12) If preferred, the end handholds may be placed on the face of end sills, as shown on the alternate illustration, Fig. F, Sheet M. C. B. 19, detail Sheet M. C. B. 19-F. **Drawing reference.**

(13) The coupler unlocking rod when properly located and having proper clearance around it under all conditions, including projecting loads, will be a suitable end handhold.

(14) *Gondola cars with fixed ends* to be provided with a horizontal or vertical handhold, on each side of each car over sill steps, with as much clear length as car construction will permit, provided handholds need not exceed 16 inches in length; and **Gondola cars. Fixed ends. Side handholds.**

(15) If horizontal handholds are used they shall be located not more than 30 inches above center line of coupler.

(16) Gondola cars without projecting end sills, having ladders located on sides, to have one vertical or horizontal handhold at upper corner of left-hand side of brake end of car. **Top-end handholds.**

(17) Vertical handhold to extend downward from about 4 inches from top of car; horizontal handhold located about 4 inches from top of car. **Side handholds high cars.**

(18) Each end of each car to be provided with two horizontal handholds not less than 12 inches and preferably 16 inches in the clear or longer, located not over 30 inches above the center line of coupler, preferably on the end sill; the coupler unlocking rod when properly located and having proper clearance around it is a suitable end handhold. **End handholds.**

Clearance. (5) All ladder treads shall have a minimum clearance around them of 2 inches, nominal clearance 2½ inches.

Footguard. (6). When wrought iron or steel ladders are placed on ends of cars with non-projecting end sills, the bottom treads to have a guard or upward projection at inside ends.

Tank-car ladders. (7) Tank cars having running boards to be provided with suitable ladders to give access to the running boards; the ladders to be located on right-hand end of sides of cars or left-hand side of ends of cars when running boards are continuous around the car. If running boards are not continuous, ladders to be so located as to give access to each end of each running board. Treads of ladders to be spaced about 18 inches apart.

Drawing reference. (8) Arrangements of ladders are shown on Sheet M. C. B. 19, Figs. A, B, C and D, and on detail Sheets M. C. B. 19-A, 19-B, 19-C and 19-D.

References. (9) See Proceedings 1902, 1906, 1907 and 1908.

Handholds.

HANDHOLDS.

Roof handholds. (1) Box and other house cars shall have handholds on roofs, in line with each ladder, running parallel with the ladder treads.

(2) Roof handholds to be placed not less than 2 inches nor more than 18 inches from the edge of the roof and be not less than 12 inches and preferably 16 inches in the clear, unless the construction of the car will not permit.

Box, etc. Side handholds. (3) *Box and other house cars with end ladders* to be provided with a horizontal handhold, 16 inches in the clear or longer, on each side of each car over sill step; located not less than 18 inches nor over 30 inches above center line of coupler; and

End handholds. (4) Each end of car to be provided with two horizontal handholds, not less than 12 inches and preferably 16 inches in the clear or longer, located not over 30 inches above center line of coupler, preferably on the end sill; the coupler unlocking rod or a tread of ladder, when properly located and having proper clearance around it is a suitable end handhold.

Drawing reference. (5) Arrangement of handholds is shown on Sheet M. C. B. 19, Figs. A and B, and on detail Sheets M. C. B. 19-A and 19-B.

Box, etc. Side handholds. (6) *Box and other house cars having side ladders* located over sill steps, a tread of such ladder, not over 30 inches above center line of coupler is an effective handhold. Ladder treads to be about 16 inches clear length.

End handholds (7) Each end of car to be provided with two horizontal handholds, not less than 12 inches and preferably 16 inches in the clear or longer, located not over 30 inches above center line of coupler, preferably on the end sill; the coupler unlocking rod, when properly located and having proper clearance around it is a suitable end handhold.

Drawing reference.

(8) Arrangement of handholds is as shown on Sheet M. C. B. 19, Figs. C and D, and on detail Sheets M. C. B. 19-C and 19-D.

Gondola cars drop ends. Side handholds.

(9) *Gondola cars with drop ends* to be provided with a horizontal or vertical handhold on each side of each car over sill steps, with as much clear length as the car construction will permit, provided same need not exceed 16 inches; and

(10) If horizontal side handholds are used they shall be located not more than 30 inches above center line of coupler.

End handholds.

(11) Gondola cars with drop ends to be provided with two end handholds not less than 12 inches and preferably 16 inches in the clear or longer, at each end of car, placed under the end sills as near the face as will insure a good safe fastening, and as shown on Fig. E, Sheet M. C. B. 19, detail Sheet M. C. B. 19-E; or,

Drawing reference.

(12) If preferred, the end handholds may be placed on the face of end sills, as shown on the alternate illustration, Fig. F, Sheet M. C. B. 19, detail Sheet M. C. B. 19-F.

(13) The coupler unlocking rod when properly located and having proper clearance around it under all conditions, including projecting loads, will be a suitable end handhold.

Gondola cars. Fixed ends. Side handholds.

(14) *Gondola cars with fixed ends* to be provided with a horizontal or vertical handhold, on each side of each car over sill steps, with as much clear length as car construction will permit, provided handholds need not exceed 16 inches in length; and

(15) If horizontal handholds are used they shall be located not more than 30 inches above center line of coupler.

Top-end handholds.

(16) Gondola cars without projecting end sills, having ladders located on sides, to have one vertical or horizontal handhold at upper corner of left-hand side of brake end of car.

Side handholds high cars.

(17) Vertical handhold to extend downward from about 4 inches from top of car; horizontal handhold located about 4 inches from top of car.

End handholds.

(18) Each end of each car to be provided with two horizontal handholds not less than 12 inches and preferably 16 inches in the clear or longer, located not over 30 inches above the center line of coupler, preferably on the end sill; the coupler unlocking rod when properly located and having proper clearance around it is a suitable end handhold.

Drawing reference. (42) Arrangement of handholds is shown in Fig P, Sheet M. C. B. 19, detail Sheet M. C. B. 19-P.

Caboose cars. With platforms. (43) *Caboose cars* having end platforms, the platform railings and posts will be effective handholds.

Without platforms. (44) Caboose cars not having end platforms to be equipped with side and end handholds, same as described for box and other house cars.

Lookout handholds. (45) Caboose cars having lookout which gives access to roof, to have handholds on top at ends of lookout, and also at sides, if lookout construction permits passing around them.

End-door guards. (46) Caboose cars not having end platforms, and having end doors; each doorway to be guarded by one or more wrought iron or steel bars, located at a suitable height and across the door opening.

Side-door handholds and steps. (47) Caboose cars having side doors, to have vertical handholds on each door post and suitable steps below doorway.

Curved handholds. (48) Curved handholds located so as to facilitate catching caboose cars under motion may be applied on sides adjacent to steps.

Cars of special construction. (49) Cars of other types of construction not covered specifically in foregoing sections, relative to handholds, sill steps and ladders, and not shown by the drawings on Sheet M. C. B. 19, shall be considered of special construction; but shall have the same complement of handholds, sill steps and ladders as is required for cars of the nearest approximate type.

HANDHOLD AND LADDER TREAD FASTENINGS, DIMENSIONS AND CLEARANCES.

Through bolts. (1) All handholds and ladder treads applied on wood shall be secured by through bolts wherever possible.

Bolt description. (2) When bolts are used, they should be not less than ½-inch diameter, with nuts on the outside wherever possible and riveted over.

Lag screws. (3) When lag screws are used, they shall not be less than ½-inch diameter, 3 inches long, and screwed into solid wood.

Rivets. (4) When rivets are used, they shall be not less than ½-inch diameter.

Clearance. (5) All handholds and ladder treads shall have a minimum clearance around them of 2 inches, nominal clearance 2½ inches.

Material. (6) All handholds and ladder treads made of wrought iron or steel to be of ⅝-inch nominal diameter or larger.

(7) The coupler unlocking rod, if properly located and having a minimum clearance of 2 inches around it will be a suitable end handhold. Coupler-unlocking rod.

(8) Brake step brackets, if properly located and not more than 30 inches above center line of coupler, will be suitable end handholds. Brake-step bracket used as a handhold.

(9) See Proceedings 1879, pages 109, 110, 111; Proceedings 1893, 1894, 1896, 1902, 1907, 1908. References.

STANDARDS FOR THE PROTECTION OF TRAINMEN ON PASSENGER TRAIN CARS.

(1) *Passenger train cars having open end platforms,* platform steps, and platform railings, the railings will be effective handholds. Railings as handholds.

(2) *Passenger train cars having wide vestibules,* the side door posts to be equipped with vertical handholds of 16 inches clear length or longer. Wide-vestibule side handholds.

(3) *Passenger train cars having wide vestibules* also to be equipped with end handholds, one on each side of each end of car, with about 16 inches clear length, attached to under side of platform end sill or face of vestibule; but the body of any handhold should not project beyond vestibule face more than one inch. Wide vestibule end handholds.

(4) *Passenger train cars not equipped with platforms* to have at each corner of each car, a vertical handhold of 16 inches clear length or longer. Non-platform corner handholds.

(5) Such cars also to have a metal sill step under each corner with tread not higher than 32 inches from the rail. Steps.

(6) Such cars also to have end hand railings extending across the ends of the cars, except within end doorways or vestibules, located about 36 inches above top of end sills or buffer beams. Hand railing.

(7) Such cars also to be equipped with end handholds, one on each side of each end of car, about 16 inches clear length, attached to end sills or buffer beams; but the body of any handhold should not project beyond the end face more than one inch. End handholds.

(8) Metal sill steps on passenger train cars to be not less than ½ by 1½ inches, or equivalent area of cross section, and to be securely fastened to the car. Step dimensions.

(9) Handholds on passenger train cars to be made of metal of ⅝-inch nominal diameter, and to be securely fastened to the car. Handhold dimensions.

(10) Passenger train cars without end platforms, but with side doors, to have vertical handholds and suitable steps below doorway. Side-door handholds and steps.

Drawing reference. (42) Arrangement of handholds is shown in Fig P, Sheet M. C. B. 19, detail Sheet M. C. B. 19-P.

Caboose cars. With platforms. (43) *Caboose cars* having end platforms, the platform railings and posts will be effective handholds.

Without platforms. (44) Caboose cars not having end platforms to be equipped with side and end handholds same as described for box and other house cars.

Lookout handholds. (45) Caboose cars having lookout which gives access to roof, to have handholds on top at ends of lookout, and also at sides, if lookout construction permits passing around them.

End-door guards. (46) Caboose cars not having end platforms, and having end doors; each doorway to be guarded by one or more wrought iron or steel bars, located at a suitable height and across the door opening.

Side-door handholds and steps. (47) Caboose cars having side doors, to have vertical handholds on each door post and suitable steps below doorway.

Curved handholds. (48) Curved handholds located so as to facilitate catching caboose cars under motion may be applied on sides adjacent to steps.

Cars of special construction. (49) Cars of other types of construction not covered specifically in foregoing sections, relative to handholds, sill steps and ladders, and not shown by the drawings on Sheet M. C. B. 19, shall be considered of special construction; but shall have the same complement of handholds, sill steps and ladders as is required for cars of the nearest approximate type.

HANDHOLD AND LADDER TREAD FASTENINGS, DIMENSIONS AND CLEARANCES.

Through bolts. (1) All handholds and ladder treads applied on wood shall be secured by through bolts wherever possible.

Bolt description. (2) When bolts are used, they should be not less than ½-inch diameter, with nuts on the outside wherever possible and riveted over.

Lag screws. (3) When lag screws are used, they shall not be less than ½-inch diameter, 3 inches long, and screwed into solid wood.

Rivets. (4) When rivets are used, they shall be not less than ½-inch diameter.

Clearance. (5) All handholds and ladder treads shall have a minimum clearance around them of 2 inches, nominal clearance 2½ inches.

Material. (6) All handholds and ladder treads made of wrought iron or steel to be of ⅝-inch nominal diameter or larger.

(7) The coupler unlocking rod, if properly located, and having a minimum clearance of 2 inches around it will be a suitable end handhold.

Coupler-unlocking rod.

(8) Brake step brackets, if properly located and not more than 30 inches above center line of coupler, will be suitable end handholds.

Brake-step bracket used as a handhold.

(9) See Proceedings 1879, pages 109, 110, 111; Proceedings 1893, 1894, 1896, 1902, 1907, 1908.

References.

STANDARDS FOR THE PROTECTION OF TRAINMEN ON PASSENGER TRAIN CARS.

(1) *Passenger train cars having open end platforms,* platform steps, and platform railings, the railings will be effective handholds.

Railings as handholds.

(2) *Passenger train cars having wide vestibules,* the side door posts to be equipped with vertical handholds of 16 inches clear length or longer.

Wide-vestibule side handholds.

(3) *Passenger train cars having wide vestibules* also to be equipped with end handholds, one on each side of each end of car, with about 16 inches clear length, attached to under side of platform end sill or face of vestibule; but the body of any handhold should not project beyond vestibule face more than one inch.

Wide vestibule end handholds.

(4) *Passenger train cars not equipped with platforms* to have at each corner of each car, a vertical handhold of 16 inches clear length or longer.

Non-platform corner handholds.

(5) Such cars also to have a metal sill step under each corner with tread not higher than 32 inches from the rail.

Steps.

(6) Such cars also to have end hand railings extending across the ends of the cars, except within end doorways or vestibules, located about 36 inches above top of end sills or buffer beams.

Hand railing.

(7) Such cars also to be equipped with end handholds, one on each side of each end of car, about 16 inches clear length, attached to end sills or buffer beams; but the body of any handhold should not project beyond the end face more than one inch.

End handholds.

(8) Metal sill steps on passenger train cars to be not less than ½ by 1½ inches, or equivalent area of cross section, and to be securely fastened to the car.

Step dimensions.

(9) Handholds on passenger train cars to be made of metal of ⅝-inch nominal diameter, and to be securely fastened to the car.

Handhold dimensions.

(10) Passenger train cars without end platforms, but with side doors, to have vertical handholds and suitable steps below doorway.

Side-door handholds and steps.

After reading the report some time, Mr. Seley said: I will now have to ask your indulgence for certain changes in the report which we have made since coming to the place of convention; these changes do not in any way interfere with the present arrangement of the matter in the report, but are merely an attempt to improve in the English language that was used in the first draft.

Mr. Seley then submitted the following changes in the report:

Under "Ladders":

(7) Tank cars having running boards to be provided with suitable ladders to give access to the running board; the ladders to be located on right-hand end of sides of cars or left-hand side of ends of cars when running boards are continuous around the car. If running boards are not continuous, ladders to be so located as to give access to each end of each running board. Treads of ladders to be spaced about 18 inches apart.

Under "Handholds":

(4) Each end of car to be provided with two horizontal handholds, not less than 12 inches and preferably 16 inches in the clear or longer, located not over 30 inches above center line of coupler, preferably on the end sill; the coupler unlocking rod or a tread of ladder, when properly located and having proper clearance around it, is a suitable end handhold.

(7) Each end of car to be provided with two horizontal handholds, not less than 12 inches and preferably 16 inches in the clear or longer, located not over 30 inches above center line of coupler, preferably on the end sill; the coupler unlocking rod, when properly located and having proper clearance around it, is a suitable end handhold.

(16) Gondola cars without projecting end sills, having ladders located on sides, to have one vertical or horizontal handhold at upper corner of left-hand side of brake end of car.

(17) Vertical handhold to extend downward from about 4 inches from top of car; horizontal handhold located about 4 inches from top of car.

(18) Each end of each car to be provided with two horizontal handholds not less than 12 inches and preferably 16 inches in the clear or longer, located not over 30 inches above the center line of coupler, preferably on the end sill; the coupler unlocking rod, when properly located, and having proper clearance around it, is a suitable end handhold.

(19) "Can" at the beginning of third line to be changed to "may.'

(24) Tank cars with end platforms and without hand railings extending around the ends of the tank to have a horizontal handhold of as much length in the clear as the diameter of the tank will permit,

secured to each head and located not less than 30 inches and not more than 5 feet above platform.

(27) Tank cars to be provided with two horizontal end handholds not less than 12 inches and preferably 16 inches in the clear or longer, located not over 30 inches above the center line of coupler; and,

(28) If preferred, the end handholds may be placed on the face of the end sills, or under the end sills, as near the face as will insure a good, safe fastening. The coupler unlocking rod, when properly located, and having proper clearance around it, is a suitable end handhold.

(38) Hopper cars without projecting end sills having ladders located on sides, to have one vertical or horizontal handhold at upper corner of left-hand side of brake end of car.

(39) Vertical handhold to extend downward from about 4 inches from top of car; horizontal handhold located about 4 inches from top of car.

(40) Each end of hopper cars to be provided with two horizontal handholds, not less than 12 inches and preferably 16 inches in the clear or longer, located not over 30 inches above center line of coupler, preferably on the end sill; the coupler unlocking rod, or a tread of ladder, when properly located and having proper clearance around it, is a suitable end handhold.

(41) "Can" at the beginning of third line to be changed to "may."

Mr. Seley then returned to the body of the report and read the following, which appears in the report in the form here given:

(74) Your committee now recommends approval and adoption of their revisions of the standards for the protection of trainmen under the general heading of Standards for the Protection of Trainmen on Freight Train Cars; also revised Sheets M. C. B. 19 and detail Sheets M. C. B. 19-A to 19-P, referring thereto; also the Standards for Protection of Trainmen on Passenger Train Cars, all as Standards of the M. C. B. Association, subject to the usual constitutional requirements as to letter ballot.

[NOTE: *In order to avoid duplication of illustrations Sheet 19 and detailed Sheets 19a to 19p, inclusive, are shown only in the standards in the back of this volume.*—SECRETARY.]

THE PRESIDENT: Gentlemen, the report is now before you. What is your pleasure?

MR. BRAZIER: I move that the report of the committee be accepted, and owing to the short time that this matter has been considered, that it be referred to the Executive Committee, for them to make the corrections recommended by the committee.

and that the recommendations made by the committee be then submitted to letter ballot.

MR. SANDERSON: Before that motion is put I would like to propose an amendment to the effect that the Executive Committee will be glad to have suggestions from the members as to modifications of the recommendations, to be received by them prior to July 6, 1908. That will give every one a chance to say what he has to say, after careful consideration and in the best possible form, what he would otherwise want to say here to-day, before the matter is submitted to letter ballot, and give the members a week in which to do this. That is plenty of time for an important matter like this. It needs handling very quickly.

MR. BRAZIER: I accept the amendment.

MR. MCINTOSH: I approve of the motion which has been made very much, as there are some matters in connection with the report for which I would like to propose changes.

(The President put the motion made by Mr. Brazier as amended by Mr. Sanderson, which was duly carried.)

THE SECRETARY: I would like to say in this connection that I have had several communications from members in the Southwest regarding action taken by the General Managers' Association of Texas. These communications will also be referred to the Executive Committee to be considered in connection with this report.

I have a motion submitted by Mr. J. S. Lentz. He makes a motion that the subject of standards relating to the protection of trainmen be referred to a standing committee to be appointed by the Executive Committee; that is, after this matter has been acted upon by the Executive Committee, any questions coming up relating to the standards for the protection of trainmen should come before a standing committee instead of a special committee, as at present.

THE PRESIDENT: It is moved and seconded that a standing committee be appointed on this subject.

(Motion carried.)

THE SECRETARY: I have a notice just handed to me by Mr. McIntosh.

There will be a special train via the Reading and Central R. R. of N. J., leaving Atlantic City 12 o'clock midnight to-night for New York, for the accommodation of those of our members who wish to leave at that hour.

The next business is the report of the Committee on Box-car Doors and Fixtures, Mr. C. S. Morse, chairman.

The Secretary read the report, as follows:

REPORT OF COMMITTEE ON BOX-CAR DOORS AND FIXTURES.

To the Members:

Your committee appointed to revise M. C. B. Sheet F, Recommended Practice for Box Car Side and End Doors, in accordance with the recommendation of the report of the committee on standards, to the 1907 convention, beg to report as follows:

The committee has made a new drawing for M. C. B. Sheet F, which shows a side door, door stops, door guides, chafing strips, wedges, hasp, hasp staple and handle; also, the location of the door stops, guides and chafing strips.

The door has been designed for an opening 6 feet, 0 inch wide, and height suitable for a car of the inside dimensions approved by the American Railway Association and the Recommended Practice of the M. C. B. Association. The sheathing of the door should not be driven tight, in order to prevent warping as much as possible.

The closed door stop should be of wood 3¾ inches wide, secured by six ½-inch bolts. The bolts should be staggered to prevent splitting the wood. There should also be at least two metal closed door stops, each secured with two ½-inch bolts with furring under the sheathing.

The door stops for the open door position should be at least two in number and provided with lips. Each stop should be secured with not less than two ½-inch bolts, with furring under the sheathing, unless posts or girths are available.

There should be two 1-inch half-oval chafing strips to protect the sheathing back of the door when open. One strip located near the bottom and the other at about one-half the height of the door.

There should be at least four bottom guides, located so that not less than two guides will engage the door in any position. Each guide should be secured to the sill of the car by at least two ½-inch bolts. The bolts for the guide at rear corner of door in closed position should have the nuts riveted over or bolts locked in other suitable manner.

The door hasp staple should be secured with two ⅜-inch carriage bolts, with the nuts inside and a washer under the nuts. The frame should be counterbored for the thickness of the nuts. The door hasp fastener should be secured with not less than two ⅜-inch bolts, with the nuts inside, and it is recommended that the fastener have a flange that will lip over the back of the wooden door stop. The door hasp fastener is a specialty which is usually purchased from manufacturers, therefore no drawing has been made.

The use of door hangers of patented designs has become almost universal, therefore it does not seem desirable to attempt to show a design for same. Each door hanger should be secured with not less than three bolts at least ⅜-inch diameter with nuts outside.

The track for the door hangers should be of some standard structural steel shape at least 3-16 inch thick, which is readily procurable on the market. The track should serve the double purpose of a runway for the hangers and a weather proof and spark proof door hood. The track should also be arranged so that the door can not drop off if the hangers are broken.

End doors are not generally used on box cars, therefore the end door and fixtures for same have been omitted.

Respectfully submitted,

C. S. MORSE, Chairman,
J. A. MCRAE,
O. M. STIMSON,
J. P. YOUNG,
W. PERCY,
Committee.

TOLEDO, OHIO, June 1, 1908.

THE PRESIDENT: Gentlemen, the report is before you, what is your pleasure?

MR. HENNESSEY: I move that the report be received.

MR. MUHLFELD: Are any of the members of the committee here on this report?

THE SECRETARY: Mr. McRae is here.

MR. MUHLFELD: I would ask why we should be put to the expense of two door stops to secure the door when it is in open position?

MR. MCRAE: Door stops are frequently broken and if there are two to secure the door in all positions, and if one is broken, there is still another to secure the door.

MR. MUHLFELD: We still have a stop at the bottom of the door and it seems to me that if we are going to apply a safety

device to take care of the failure of one device we could go on indefinitely. I should think that one substantial stop at the back of the door, in addition to the one at the lower edge ought to be sufficient.

MR. KLEINE: I notice that the committee has done some very good work on these particular questions, but there seem to be a few points which may be further materially improved. The present recommended practice shows the lip of this bottom door guide bracket very close to the siding and in that location they are not so frequently broken off as they would be with the lip on bracket extending about 3½ inches from the siding as shown in the recommended design of the committee. The top door rail is but 7¾ inches in height which gives very little bearing for the top door hangers, and as the securing of the top door hangers is important it would be well to specify the size and spacing of the bolts that secure the hangers. This spacing of the bolts securing the hangers to the doors is very often so short on existing cars that the brackets are found loose and when in that condition interfere with the easy operation of the door. Each end of handhold is shown fastened by two screws and one bolt. By adding a lug to be let into the wood the two screws could readily be omitted. I, therefore, make a motion that the committee be continued to consider these recommendations.

MR. D. P. FLORY (Cent. of N. J.): The carriage bolts pull out easily. Lately we have been extending the door hasp staple so as to put in three bolts. I would like to make that suggestion to the committee.

MR. GAINES: I want to confirm what Mr. Flory has said about the door hasp catch. I think it is right and proper. Now, there is another matter here that I think the committee should give further attention to. They show on the bottom of that door a ⅛ by 1¼ inch protection strip. That is not wide enough nor securely fastened. We need something a good deal more substantial on the bottom of these doors. These little light strips are always coming off and getting loose and are a good ways from being what we want.

MR. MCINTOSH: I wish to second Mr. Kleine's motion that this committee be continued to consider the subject further. We all realize that a great deal of trouble is encountered with doors failing in one way or another and that we should endeavor to cover every point where they can be improved, and with that in view I second the motion and I hope it will prevail.

THE SECRETARY: Mr. President, I have a letter from Mr. Morse, the chairman of the committee, which I will read.

> Referring to the report of Committee on Box Car and Door Fixtures:
>
> If this report is adopted, in printing the new Sheet "F" the door stiffener angles should be made 1¼ by 1¼ by 3-16 inches, as the size shown, 1½ by 1¼ by 3-16 inches is not a standard angle.
>
> The bolt holes on the closed door stops and the open door stops should be 9-16 inch square instead of 9-16 inch round, as carriage bolts will be used to secure these with the nuts on the inside of the car. Also, the bosses around the holes on the closed door stops and the open door stops should be 1⅛ inches instead of 1 inch. I am attaching sheet from the advance copy showing the dimensions referred to.
>
> Yours very truly,
>
> C. S. MORSE, Chairman.

THE PRESIDENT: The motion is that the report of the committee be received, the committee continued to consider the suggestions that have been made here this morning, and report again next year.

(Motion seconded and carried.)

THE PRESIDENT: The next in order is the report of the Tank Car Committee, Mr. Gibbs.

Mr. Gibbs here read the report and followed with an appendix. The report and appendix are as follows:

REPORT OF THE COMMITTEE ON TANK CARS.

To the Members:

At the 1907 convention the paragraph relating to the axle requirements and the stenciling of the tank cars with light weight and capacity or light weight and maximum weight was discussed and some exceptions taken. The opinion was expressed that such markings would bring about complications with the traffic rate schedules based upon a weight per gallon and the capacity of the car in gallons, but it was considered essential that some maximum or limit weight marking should be placed upon tank cars to enable inspectors to determine whether the strength of axles and trucks were sufficient to carry the load. This resulted in the following motion being carried at the convention: That the recommendation of the committee be accepted and referred to letter ballot, eliminating the capacity of the cars, the amendment being proposed by Mr. Crawford and accepted by Mr. Schroyer: That the proposition should be submitted to letter ballot under two headings.

The following questions were submitted to letter ballot and both failed to receive the necessary two-thirds vote:

89. Tank car specifications, including provision for stenciling light weight and capacity.

90. Tank car specifications, excluding provision for stenciling light weight and capacity.

It is quite evident that the two questions as appearing in letter ballot did not cover the views of the members as expressed in the discussion, namely, that light weight and capacity markings were objectionable from a traffic schedule standpoint and that a maximum weight was necessary to enable inspectors to determine the strength of axles and other parts of trucks.

A further canvas of the situation has been made and it is found from a traffic viewpoint that there are no objections to stenciling tank cars "Limit Weight," which will afford inspectors all the necessary information from a safety standpoint, but will have absolutely no bearing on the traffic question of how much is lading and how much is car.

This will involve some change in the requirements for tank cars as submitted last year relating to axles, besides which it is desirable to make slight modifications in some of the other detail requirements to bring them up to date, which are as follows:

TRUCKS, SIZE OF AXLES.—Each truck must have a strength equal to or greater than the strength of the axles used.

Sizes of axles must conform to rule relating to axles in M. C. B. Rules of Interchange for Freight Cars, which have been modified as below to make them applicable to tank cars:

Axles less than the following prescribed limits:

Owners Responsible.

TABLE I.

FOR TANK CARS MARKED LIMIT WEIGHT I.

Limit Weight I in lbs.	Journal.	Wheel Seat.	Center.
161,000......	5 inches	6¾ inches	5⅞ inches
132,000......	4½ "	6¼ "	5 5-16 "
112,000......	4 "	5⅝ "	4⅞ "
95,000......	3¾ "	5 "	4⅜ "
79,000......	3½ "	4¾ "	4⅛ "
66,000......	3¼ "	4⅝ "	3⅞ "
58,000......	3 "	4¼ "	3½ "

TABLE II.

FOR TANK CARS MARKED LIMIT WEIGHT II.

Limit Weight II in lbs.	Journal.	Wheel Seat.	Center.
161,000......	5 inches	6¾ inches	5⅞ inches
132,000......	4½ "	6¼ "	5⅜ "
112,000......	4¼ "	6 "	5¼ "
95,000......	3¾ "	5½ "	4¾ "
79,000......	3½ "	5¼ "	4⅝ "
66,000......	3¼ "	4⅞ "	4¼ "
58,000......	3 "	4¾ "	4⅛ "

All tank cars to have Limit Weight I, or Limit Weight II stenciled on them.

New steel underframe tank cars built hereafter must have axles to meet requirements of Table II, and cars stenciled Limit Weight II.

Existing tank cars built prior to this date must have axles to at least meet requirements of Table I, and preferably Table II; and be stenciled "Limit Weight I" if the axles conform to Table I; or "Limit Weight II" if the axles conform to Table II. When all the axles under any car are changed to meet the requirements of Table II, the stenciling must be changed from "Limit Weight I" to "Limit Weight II" to protect the tank car owner when renewals of wheels or axles are made in repairs.

SAFETY APPLIANCES.— Change to read: "Each end of car must be provided with the necessary steps, grabirons, etc., to comply with the requirements of the M. C. B. Association. Each tank car must be provided with substantial and adequate hand railing securely fastened and applied as shown in the Standards of the M. C. B. Association. Where, from the construction of a car, a side hand railing is inadmissible, and therefore, involves an overhead running board and high brake staff, each end of car must be provided with ladders to comply with the requirements of the M. C. B. Association."

The above change is suggested to more clearly specify the use of the M. C. B. Standards.

DOME YOKES, TANK STRAPS, ETC.— Change to read: "Tanks must be secured from turning on the underframes, either by center anchors riveted to the tank and underframes, or by means of dome yokes, and must also be secured to underframe by means of tank straps, two for tanks not more than 76 inches in diameter, and four for tanks of greater diameter. The center anchors may be made of two parts, sliding into each other, one riveted to the tank and one to the underframe. The sectional area of dome yokes and tank bands must at no place be less than ¾ of a square inch, or 1 inch round iron upset to 1⅛ inches at threaded end. Cars having no underframe, with tank securely riveted to body bolsters, do not require dome yokes or tank bands."

The following has been added to the above paragraph: The center anchors may be made of two parts sliding into each other, one riveted to the tank and one to the underframe. This method of securing tank to underframe when properly designed is efficient and, therefore, should be allowed.

VENT HOLE OR SMALL VALVE.— Change to read: "Tank cars carrying non-inflammable or non-volatile material, such as sulphuric acid, vinegar, linseed oil, cotton seed oil, lard oil, fish oil, tannery products, glucose, molasses, calcium chloride, caustic soda, silicate of soda, etc., need not be provided with 5-inch safety valves, but each tank must have a small open vent or valve equal to not less than 2 inches in diameter."

The size of opening for small open vent or valve has been specified to be equal to not less than 2 inches in diameter. The question as to the size of this opening has repeatedly been raised by tank car owners and builders and, therefore, a recommended size is given, which is considered necessary to relieve the tank of pressures developing in case a loaded tank car carrying commodities enumerated under this heading is surrounded by fire. It is entirely a safety requirement, and in the absence of any specific tests on record to determine the exact size, it is felt that at least a 2-inch opening should be provided. Your committee, however, is following up this question to obtain some reliable data in regard to the exact size of opening necessary.

CENTER SILLS.— Change to read: "If cars are not equipped with intermediate sills, the underframes must have two center sills, each not less than 5 inches wide by 10 inches deep, or the equivalent in strength. If the car is equipped with intermediate sills, the center sills must not be less than 5 inches wide by 9 inches deep, or the equivalent in strength. Center sills must not be spaced more than 18 inches apart."

The above paragraph has been rearranged to make the reading more clear, no change having been made in the requirement.

Draft Timbers.— Change to read: "Draft timbers secured to inside of center sills and extending to cross-bearer or cross-timber will be accepted as a substitute for filling timbers referred to above. Where center sills are 9 inches wide by 10 inches deep or over, and draft timbers are placed between same, they need not extend farther back than body bolster, provided they are adequately secured to center sills by means of seven ⅞-inch bolts, or their equivalent, and butt against body bolster. Draft timbers located underneath the center sills must not be less than 4 inches wide by 8 inches deep, and each draft timber must be held to center sills, end sills and buffer block by means of seven or more ⅞-inch bolts, or six 1-inch bolts. Where an arrangement for supporting draft timbers is substituted for one or more bolts and the construction is of equal strength, the same will be acceptable. Draft timbers extending beyond bolster must be secured to center sills by additional bolts."

No change in requirements in this paragraph has been made but a rearrangement of the wording to assist the inspector in correctly interpreting same.

Longitudinal Anchorage of New Tank Cars.— In tank car report to the 1907 convention your committee called particular attention to the necessity of some improved method of preventing end movements of tanks, and wishes to emphasize that the present method of fastening tank between headblocks is unsatisfactory, and in the tanks of larger capacity is causing serious damage to the steel underframes in driving down the ends. New tank cars built hereafter should be securely anchored to the underframe either at the center or at one end, which will prevent the shifting of the tank on the underframe and thus avoid the constant hammering of the tank against the head blocks and will also allow for the necessary expansion when the tank is steamed. Your committee is not prepared to incorporate this in the requirements, but all new tank cars built in the future should be anchored in this manner.

In conclusion your committee would recommend that the following specifications be submitted to letter ballot for adoption as Recommended Practice:

1. Tank car specifications, with the exception of axle requirements, presented last year with the modifications suggested in this report, it being understood that the axle requirements and stenciling Limit Weight will be voted upon separately.

2. Axle requirements with the provision that the tank cars be stenciled *Limit Weight*.

Respectfully submitted,

A. W. Gibbs, Chairman,
C. M. Bloxham,
W. McIntosh.
S. K. Dickerson,
F. T. Hyndman,
Committee.

Altoona, Pa., May 26, 1908.

APPENDIX TO TANK CAR REPORT.

Since the Tank Car report has been sent to the Secretary for printing an accident involving a tank car loaded with hydro-carbon (gas residue) has been brought to our attention. The car was being classified and owing to the car not being controlled by hand brakes it ran into the draft ahead with sufficient force to cause shifting of tank on the wooden underframe, resulting in damage to the valve extension, allowing escape of the liquid. This case emphasizes the importance of so securing the tank to the underframe as to prevent longitudinal movement, either by an anchorage at the center or at one end as brought out in the tank car report under the heading of "Longitudinal Anchorage of New Tank Cars."

Owing to the value of products carried in tank cars and the possible results of escape of such liquid in case of accident the committee recommends that for tank cars where tanks are secured by head blocks as much longitudinal clearance be provided for tank valve extension as the construction will permit with a minimum of six inches on each side toward ends of car.

This case also developed the fact that all of the discharge valves are not perfect, or are not perfectly maintained, and in some cases allow leakage to the tank valve extension depending upon the cap which covers the bottom of the extension to prevent any leakage from the tank, and your committee directs the attention of tank car owners to the importance of maintaining discharge valves in a tight condition to prevent leakage.

This tank was equipped with two 2-inch open vents, and after the fire had communicated to the tank they proved sufficient to discharge the gases to prevent any undue internal pressure on the tank. Originally the tank car in question was used in the coal-tar traffic, and when taken out of this service and used for hauling hydro-carbon should have been equipped with safety valves — in fact, any tank cars that are liable to haul inflammable or volatile material should be equipped with 5-inch safety valves, or safety vents with lead disks.

The question has also been raised by the owners of tank cars carrying non-inflammable or non-volatile material, where an open vent or valve equal to not less than 2 inches in diameter may be used, that this size of opening is unnecessary. In the absence of any tests for specific commodities coming under this head, your committee feels that all tank cars carrying liquids coming under this head should be equipped with this size of open vents, or if this is injurious to the lading, the safety vent with lead disk or the standard safety valve should be applied, according to the commodity transported in such tanks.

Your committee, therefore, suggests under the heading of "Vent Hole or Small Valve" in their report, that the word "must" be substituted for the word "should," in the following sentence: "but each tank must have a small open vent or valve equal to not less than 2 inches in diameter."

Respectfully submitted,

A. W. Gibbs, Chairman,
C. M. Bloxham,
W. McIntosh,
S. K. Dickerson,
F. T. Hyndman,
Committee

The President: Gentlemen, the report is before you; what is your pleasure?

Mr. Hennessey: I move, Mr. President, that the report and appendix be received with a vote of thanks to the committee, and the recommendations submitted to letter ballot.

The President: The motion is that the report of the committee be received and the recommendations, including those in the appendix, be referred to letter ballot.

(Motion seconded and carried.)

Mr. Crawford: I would like to move that the committee be continued to investigate further the subject of the vent hole, in order to determine just what requirements we shall enforce on the tank car owners.

Mr. Hennessey: I will include that in the original motion and that will save time.

Mr. Gaines: If we are going to have a continuance of the committee I think we ought to have something for the proper securing of the tanks to the underframe.

The Secretary: The committee will take the suggestions made into consideration.

The President: The next in order is the report of the Committee on Subjects.

The Secretary: The report of the Committee on Subjects is as follows:

REPORT OF THE COMMITTEE ON SUBJECTS.

To the Members:

Your Committee on Subjects for the year 1908-1909, after making thorough and in some cases repeated inquiries from individual members and railway clubs for suggestions indicating subjects for committee reports, have met with the usual results in that very few replies were received. Among these, however, is one which seemed to be of more than usual importance, and we beg to quote the substance thereof as an introduction to our report. This communication is from a prominent railway officer, who in making a reply to our circular letter uses the following language:

"In looking over the subjects assigned to committees by the Association, it seems to me that the matters of greatest interest are very well covered by the standing committees, and the subjects assigned to the special committees are entirely too important to endeavor to settle them definitely between conventions. It has been my feeling that for some time too much work has been undertaken by the Association to be disposed of in a convention lasting but three days, and that either the number of subjects should be decreased or the time of the convention increased. There has not been, in my opinion, a sufficient amount of discussion on the floor of the convention of some of the reports."

Your committee not only concurs in the suggestions and criticisms embodied in the above quotation, but would strongly urge that the Association give serious thought, not only to the number of subjects, but the time allotted for their consideration, and acting on these suggestions in the preparation of our report we offer only three subjects for consideration in 1909, in connection with those which are left over from the 1908 convention:

First.— Standard structural shapes for steel freight and passenger cars.

Second.— Standard tests and specifications for car bolsters and definite location of side bearings. The side bearing location to have special reference to the top member or section of truck bolster.

Third.— To recommend as a standard a universal interchangeable steam hose coupler. This committee to specify contour, or outlines, more completely than the present recommended practice, so that these couplers shall be really interchangeable.

For topical discussions your committee recalls its above suggestions with reference to inadequate time to properly handle the present work of the Association; we will, therefore, offer a limited number of topical discussions:

First.— Your committee is advised by the Secretary that Mr. Geo. L. Fowler was asked to present an individual paper on "The Stresses to which Car Wheels are Subjected," but at his request the paper will be presented more in the nature of a topical discussion. It is therefore suggested that the discussion of this subject be taken up at the noon hour of the first day.

Second.—Manganese or other special steel coupler knuckles — does it pay to use them? If so, what is the difference in cost from other steel knuckles?

To be opened by Mr. S. P. Bush.

Third.— The abolishment of the brake beam safety chain.

To be opened by Mr. J. J. Hennessey.

Fourth.— Should journals of standard axles, when fillets are partially worn, be made longer in order to get in a full-sized fillet? If so, what should be the limit of the length of journal?

To be opened by Mr. W. E. Fowler.

Could we not have as Topical Discussions kindred subjects under one general head? As, for instance, at one session discuss matters pertaining to the construction of cars, or what might be termed manufacturing or shop questions, while at another session subjects pertaining to their operation or interchange. This, with a view of securing a concentration of thought and attendance on the part of the membership at one and the same time, to the end that the subjects under discussion would receive prompt and thorough analysis.

Your committee begs to intrude the suggestion that with the increased volume of work devolving upon the Association, together with the collateral interests in the way of very elaborate and interesting exhibits which require considerable time, the Association should take steps toward either lengthening the time at present assigned for the work or eliminating some of the present features, to the end that much of the work which in the past has not received proper consideration may in the future have the attention and treatment which it justly deserves.

W. E. SYMONS, Chairman,
WM. FORSYTH,
H. LARUE,
Committee.

CHICAGO, April 17, 1908.

THE SECRETARY: I would make a motion, Mr. President, that the report of the Committee on Subjects be received and referred to the Executive Committee for consideration.

Motion seconded and carried.

THE PRESIDENT: The next order on the program is Unfinished Business.

The Secretary: Mr. President, under the head of unfinished business, I have the report of the Committee on Correspondence and Resolutions.

The Secretary here read the report as follows:

Your committee on the above subject begs to respectfully advise that this convention is under special obligations to His Honor Mayor Stoy of this city for his kindly and hearty welcome to the members of the Association and their friends.

To Mr. Eugene Chamberlin of Buffalo, N. Y., for his genial address to the convention.

To Mr. Edward A. Moseley, Secretary of the Interstate Commerce Commission, for the honor conferred upon this Association by his visit and kindly advice.

To all of the officers of the Association, especially to the Secretary, whose efforts to serve and please the Association are worthy of special mention.

To the various committees appointed to consider and report upon the various subjects assigned to them and for the thorough and painstaking manner in which they performed their various duties.

Your committee finds it difficult to express the many obligations the members of the Association and their families are under to the Committee of Arrangements for attending so well to the comfort and amusement of those in attendance at the convention.

To the Pennsylvania Railroad, Central Railroad of New Jersey, Philadelphia & Reading Railroad, and the railroads in general through the country; also to the Pullman Company for their kindness in furnishing transportation to the members of this Association and their families.

To the Railway Supply Men's Association for their specially fine arrangements of exhibits, and for their kindness in attending to the comfort and pleasure of the members of the Association and their families.

We wish to specially mention in this respect the President and Secretary of the Railway Supply Men's Association.

To the *Railway Age-Gazette* for its daily issue, each copy of which has been of more than special interest.

To the Press in general we wish also to express our appreciation.

To the various hotels of this city we are obligated for their hospitality, and their continued effort to carefully and willingly attend to the needs of the members of this Association and their friends.

J. F. Walsh,
G. W. Wildin,
L. H. Turner,
Committee.

Mr. Peck: I move that the resolutions be adopted.

Motion seconded and carried.

THE SECRETARY: Now, Mr. President, we have arrived at the topical discussions. We postponed the discussions of the first and second day. A motion was made to allow those who were to open these discussions to print their remarks in the Proceedings. If they will kindly send their discussions to me, I will have them printed in the Proceedings. The subjects for discussion to-day some of the members would like to have preceded by another topic entitled "The Abuse of the Repair Card," and the President has suggested that Mr. Hennessey, Master Car Builder of the Milwaukee road, be requested to open the discussion on this subject. This is an important one to the members of the Association.

TOPICAL DISCUSSION—"THE ABUSE OF THE REPAIR CARD."

MR. HENNESSEY: Mr. President and gentlemen, as to the recommendation of the President that some measure be adopted to compel the application of repair card in all cases of foreign car repairs, I do not think there is any matter of more vital importance before this convention than this. In fact, the repair card has now become almost extinct. A very large number of roads, when making repairs to our cars, do not apply the repair card. If there is one thing that has made this organization great it has been its reputation and its general standing for honesty; but just as soon as we become indifferent to the application of repair cards, just so soon are we setting a precedent to make a great many people believe that the roads are not complying with the M. C. B. Rules, and that they are deviating from the path of honesty. If you will look into the matter you will find bills rendered six or eight months after the repairs have been made; trace up your car, when it comes home, no sign of a repair card ever being applied. The Arbitration Committee has had request after request asking if there is not some possible way to correct this; if we could not penalize roads that are making repairs and not applying the repair cards. I for one do not believe for a minute it is the intention of the heads of the car departments to have this important item overlooked. It is simply carelessness in the subordinates. The inspectors and repairmen possibly are responsible for it; but I would make one suggestion and I think it ought to be taken very seriously, that every man who is head of a car department, on his return home from this convention, should send out a very strong circular letter to all of his carmen stating that they must positively apply a repair card in each and every case of repairs to foreign cars. Then when the car is received home with wrong repairs, you can tell at once who did the work, and not be tracing for months, accumulating correspondence and an endless amount of labor, trying to locate where repairs were made. There are several gentlemen who have been writing every few weeks to the Arbitration Committee asking them to do something to provide a remedy in this matter. I would like to hear from them now. [Applause.]

THE PRESIDENT: Any further discussion?

MR. PECK: In a great many cases you can not use repair cards.

THE PRESIDENT: Any further discussion?

MR. BRAZIER: I believe, as Mr. Hennessey says, that this is a very important matter. We should be honest in all our dealings relative to the repairs of equipment. The M. C. B. Rules call for the application of repair cards, but I admit there are times when men find it is almost impossible to apply them owing to cars being moved and for other reasons. I stated last year in the convention that I did not believe in dishonest practices, and I would be inclined to discharge a man if he pretended to put on a repair card and then found that he did not do it. I then stated that we needed another rule, that was the Golden Rule, which I think will bear repeating. Furthermore, when Mr. Hennessey or any other Master Car Builder writes me relative to the condition of any equipment which is under my jurisdiction and gives me the condition of the same, I feel that they are telling me the truth, and it is very rarely but that we have always given foreign lines authority to bill us for such defects as I have outlined, and that is the spirit I want to be understood as following when we are writing about the condition of foreign equipment. I do not always personally see each case; the division men report the condition of foreign cars and we take the matter up with the car owner, and if we drill all our subordinates to be strictly honest and live up to the rules, there will be no trouble. There is a tendency, I fear, with some roads to make a big showing on repairs to foreign cars. Under the M. C. B. Rule prices there is a profit to some roads to do certain kinds of work, such as cleaning triple valves. It should be understood that when triple valves are cleaned the work should be done honestly, the brakes properly adjusted, and not endeavor to see how many triples can be cleaned, but to know that the work is done right. If we can bring about this feeling of honesty in making repairs, the results will be very beneficial.

Mr. Clark: We have had a good deal of trouble, such as Mr. Hennessey has mentioned. I had not thought of issuing a circular of instruction, but I intend to do it when I get home, and I think it would be well for us all to do it. I offer a resolution that the heads of departments, on their return, issue circulars calling the attention of their repairmen and all having to do with the handling of repairs, to the rules and give instructions that they be strictly observed.

Mr. Fowler: Before any action is taken, I would like to add my testimony and the weight of what I may have to say, to what Mr. Hennessey said. Perhaps it may be put in a little different way. The heads of every railroad in this country expect their employees to be honest and fair. The trouble is that the employee does not always follow the instructions, so that I think an appeal might be made in that way.

We may say that it is to our individual interest and to the interest of every railroad here to have the repair cards properly applied. I do not think there is any railroad on the continent to-day that is not suffering from this violation of the rules. We are continually finding wrong repairs made to cars and we are unable to locate the people responsible. It just occurred to me it would be necessary for us in issuing this circular to our subordinates to see that the cars are held long enough to write the repair card and make the cards and put them on. Perhaps the work could be facilitated by making use of some suitable appliance. I would suggest this merely as a passing thought to the men who are responsible for the car department so that they may consider the men that have to do the work when they get home.

Mr. Peck: Mr. President, I think we ought to include in that circular, not to have defect cards asked for when repairs are not made. We find more trouble with that in Chicago than any other thing. I have had five defect cards asked on one car and no repairs made. I think that ought to be included in the circular.

Mr. Hennessey: Mr. President, I want to second Mr. Clark's motion. I believe that if the heads of departments send out this circular letter and call the attention of subordinates to this subject, making it strong that we will hold them responsible, we shall have such an improvement in the application of repair cards that we will hear no more complaints on this score.

The President: The motion is, that the heads of departments, on their return, issue a circular of instructions calling the attention of their repairmen and all having to do with the handling of repairs, that the rules be strictly observed.

(The motion was carried.)

The President: The next topical discussion, gentlemen, is, "Should journals of standard axles, when fillets are partially worn, be made longer in order to get in a full size fillet? If so, what should be the limit of the length of journals?"

Discussion to be opened by Mr. Fowler, of the Canadian Pacific Ry.

TOPICAL DISCUSSION—"LENGTHENING OF JOURNAL WHEN FILLETS ARE PARTIALLY WORN."

Mr. W. E. Fowler (M. C. B., Canadian Pacific Ry.): Mr. President, there are very few iron axles put under the modern freight car. The axle of to-day is made of open hearth steel, a material which does not give good service in carrying heavy loads or in sustaining severe shocks if its outline be composed of sharp corners or angles, and the designers of the M. C. B. standard axles accordingly have provided that, where there is a step or change of diameter, there should be what is known as a fillet or curved graduated connection between the larger and smaller diameters, because if a sharp corner or right angle be allowed, a fracture is invited at that point and a great loss of property will probably ensue.

The lengthening of journals of axles in order to replace worn fillets is a practice which is more or less followed on all railroads, but so far as my knowledge extends, there are no generally observed limits to this extension of length.

In my opinion an axle with the journal fillet entirely worn out should, when withdrawn for changing wheels, be scrapped.

The reformation of the entire fillet with the consequent lengthening of the journal is an unsafe practice, because, when the fillet is quite worn out, there is, in all probability, an incipient crack where the fillet was formerly, and it is only inviting trouble to return such axles to service.

Considering the disastrous results that follow a broken journal, I think " an ounce of prevention is worth a pound of cure " in this as in many other cases, and the prevention consists in rigidly scrapping all axles with worn-out fillets.

There are, however, many axles drawn from service on account of wheel failures that have fillets partially worn, and which may, in the opinion of many, be made fit for long further service by putting them in the lathe and lengthening back the dust guard shoulder and so renew the fillet, so essential to the load-carrying character of the journal.

I think it will be generally agreed that excessive lateral movement of the journal bearing on the journal (which, of course, means also movement of the superimposed load) is not desirable, in fact is injurious to wheels, axle and truck, car body and track, and in view of the heavy load now carried, the speed attained and the consequent stresses on the wheel flange, we should make our wear limits less and our inspection more rigid, to preserve the same factor of safety with the heavy capacity car and the high speed than we formerly had with the light car and low speed.

We have limits of diameter for journals, wheel seats and axle centers, we have limits for thickness of collars, and we should have limits for length of standard journals, for the reasons enumerated; also to keep within reasonable limits the lateral movement of journal bearings (and consequently the truck frame) on the journals.

In view of my opinion that only partially worn fillets should be reformed by lengthening the journal, I think that a length limit of 7½ inches should set for 7-inch journals, 8½ inches for 8-inch journals, 9½ inches for 9-inch journals, and 10½ inches for 10 inch journals.

THE PRESIDENT: The subject is now open for discussion. Does any member wish to say anything on this matter?

MR. HENNESSEY: Mr. President, I think this is almost too important a subject to pass without saying anything on. I agree fully with Mr. Fowler that it is a dangerous practice to attempt to turn a fillet in an axle after it has been once worn out. We allow as much lateral motion on the axle when new as we consider advisable. When you attempt to put in this additional lateral motion, you run the risk of a broken journal. That is not the only risk. As you are all aware, with the standard M. C. B. axle our journal boxes at the present time are running close to the hub of the wheel, and you save your journal and very often destroy the oil boxes.

MR. FORSYTH: Mr. President, I move that this subject of the limit of length of journals be referred to the Committee on Standards. (The motion was carried.)

THE SECRETARY: The subject, "The Advantages and Disadvantages of the All-steel Box Cars," was to be opened by Mr. W. R. McKeen, Jr. I think Mr. McKeen is not present to-day.

MR. SELEY: Mr. President, that is a very important topic in view of the present development in cars, and I hope the Secretary will invite Mr. McKeen to supply this discussion, to be printed in the Proceedings.

MR. HENNESSEY: I second that motion, Mr. President.

MR. SELEY: I might say, Mr. President, that I am not in sympathy at all with the idea of the all-steel box car, but I would like to hear what the other fellow has to say.

Mr. McKeen subsequently presented the following discussion:

TOPICAL DISCUSSION—"THE EVOLUTION OF STEEL IN CAR CONSTRUCTION."

MR. W. R. MCKEEN, JR. (Union Pacific R. R.): Owing to the diminution in the lumber supply all over the country and the present difficulty in securing lumber for the large number of freight cars required annually to take care of the increasing business on the railroads of this country, it seems that the introduction of steel in the superstructure of box cars, as well as the underframing, is inevitable.

The first and common impression is that, with the substitution of steel for wood, the light weight of the car would be ordinarily increased; but taking into consideration the superiority of steel as a material for box cars, as compared with wood, and making a design of car to suit the nature of structural material used, we find for the same capacity the all-steel car can be built of superior strength, of longer life, and of lighter weight than the combination steel underframe, wooden superstructure box car.

It is also a common idea that the sweating of an all-steel car will seriously interfere with the transportation of commodities; but this fact has been quite extensively controverted, as the experience gained with the operation of the two Union Pacific all-steel box cars which, up to the present time, have been in service over eighteen months, and subjected to the excessive climatic changes and conditions of the middle and far West, as well as the warmer climates of Texas and other southern States, disproves this illogical conclusion.

If it is not necessary to insulate a steel passenger car, it seems self-evident and conclusive that it is not a necessity to insulate a steel box car to guard against the warmer temperatures of the summer months.

Account of the strength of the steel plates, posts and bracing, all of which are tied into an integral structure in a steel box car, the trouble with bulged ends and sides, which the design of the wooden car has never been able to eliminate, can in the steel car be entirely overcome.

The steel car has many advantages over the wooden car in the transportation of small grain and commodities that are liable to leak through cracks and crevices.

With the steel car, which has an absolutely rigid frame, the necessity for having a flexible roof is eliminated.

In conclusion: If an all-steel box car can be built with such superior strength, thus prolonging its life, and of lighter weight, with the additional reliability over a wooden car, there seems to be no reasonable excuse for the perpetuation of wooden car structures, although it is the universal practice in the present age to construct cars with underframing of steel and superstructure of wood. Taking into consideration that the underframing of cars built in former years were both wood and steel, it would apparently indicate that the time had arrived for the introduction of steel into the entire car structure.

The Union Pacific all-steel box cars have developed no defects of any description; nor have there been any complaints from the sweating action.

THE PRESIDENT: Unless some one has something to bring up, the next order of business will be the election of officers. I will again read the report of the Nominating Committee, as read yesterday.

(The Secretary read the report.)

To the Members:

Your committee begs to recommend the following officers for the ensuing year in line with the President's remarks at yesterday's meeting, relative to the necessity for closer affiliation with the American Railway Association:

President — R. F. McKenna.
First Vice-President — F. H. Clark.
Second Vice-President — T. H. Curtis.
Third Vice-President — LeGrand Parish.
Treasurer — John Kirby.
Executive Members — J. E. Muhlfeld, C. E. Fuller, H. D. Taylor, J. F. Walsh, C. A. Schroyer.

Respectfully submitted,

J. S. LENTZ,
F. W. BRAZIER,
J. A. BUKER,
H. D. TAYLOR,
W. A. NETTLETON,
Committee.

Mr. Fowler: Mr. President, I would like to ask that it be referred back to the Nominating Committee and that it reconsider it.

The Secretary: We would have to take an adjournment to hear the Nominating Committee's reconsideration.

Mr. Fowler: I do not think it is necessary for me to say very much on this subject. I prefer not to. But I believe that if there is an emergency requiring this Association to go back on all its precedents, it should be carefully considered in all its bearings. I was pained and astonished yesterday at the action taken by the Nominating Committee, but I did not feel that yesterday was the proper time to say anything about it, but I think it would be wrong for me to allow this action to pass without making a protest against it. Gentlemen, you are setting up a precedent now, if you adopt this report, that will be so far-reaching that no one knows where the end of it will be; and if you desire to wipe out all former precedent and well-established custom, let it be done in a thorough way and clean the slate.

The President: Gentlemen, the report is before you. A motion would be in order to approve the action of the Nominating Committee.

Mr. Crawford: I would ask the Secretary to read the requirements of the Constitution regarding nominations.

The Secretary: The requirements regarding nominations are contained in Article VIII of the Constitution, which reads as follows:

> At the first session of the annual meeting, the President shall appoint a nominating committee of five members, who are not officers of the Association, and this committee shall send the names of nominees for offices of the Association to fill vacancies for the ensuing year, to the Secretary before the election of officers is in order, and they shall be announced by him as soon as received. The election shall not be held until the day after such announcement, except by unanimous consent. Any three other members may nominate candidates for any office.

Mr. Hennessey: I move the recommendation of the Nominating Committee be accepted.

The President: The motion is that the recommendation of the Nominating Committee be accepted. All in favor say " Aye." The motion is carried.

MR. DEVOY: If it is in order I move that the Secretary be instructed to cast the ballot for the names of the officers and members of the Executive Committee as proposed by the Nominating Committee.

(The motion seconded and carried.)

THE SECRETARY: Mr. President, I cast the ballot as directed for the officers named.

THE PRESIDENT: I declare the gentlemen nominated to be duly elected.

Gentlemen, I wish to take this opportunity to thank you for the kindness and support you have given me during the year, and at this convention, which I shall always remember. I also wish to thank our worthy Secretary for his untiring assistance. I now take great pleasure in surrendering the office and gavel to so worthy a successor as Mr. McKenna. [Applause.]

PRESIDENT MCKENNA: Gentlemen, I want to take this opportunity to express my appreciation of the honor conferred on me in electing me to preside over this organization.

I rather regret the matter that has come up this morning, but do not desire to express any opinion on the subject. I do not know of any organization in this country that it would be more of an honor, or a greater pleasure to preside over than that of one with the standing of the Master Car Builders' Association. It is one of the few organizations to which are extended functions somewhat of a legislative character, and I want to assure you that my very best efforts will be used in maintaining and upholding the present standing of the Master Car Builders' Association in the United States. [Applause.]

THE SECRETARY: Mr. President, Mr. Dow told me some time ago that to preside over this convention was a great task for him to assume, and he was going to be the most scared man in Atlantic City.

We have with us this morning another gentleman who has also told me that he is scared. I do not know why he should be, but I would like to ask that the privileges of the floor be granted to him to see whether he can make a speech or not. I refer to the chairman of the Railway Supply Men's Association, Mr. Walbank.

THE PRESIDENT: If there is no objection, the privileges of the floor will be extended to Mr. Walbank.

MR. R. T. WALBANK: Mr. President and Gentlemen, it is quite a difficult task which I have before me, as I have never made a speech in my life.

The Railway Supply Manufacturers' Association, which I have the honor to represent, receives great pleasure in getting orders and making prompt deliveries. Sometimes it is rather difficult to do either. In the last few months, the difficulty has been in the getting of them.

Mr. Dow, both you and I are men of few words, as the members of the Association have found out. I am commissioned to present you this medal, in token of our recognition of the services which you have rendered as President of the Master Car Builders' Association, an office which you have filled to the entire satisfaction of your associates. I hope that you will have as much pleasure in receiving this medal as I have in presenting it to you. [Applause.]

MR. DOW: Mr. Walbank, Gentlemen of the Supply Men's Association and the Master Car Builders' Association, I do not know but that I feel fully as embarrassed in accepting this medal as Mr. Walbank did in presenting it.

In accepting this emblem, gentlemen, I wish to say that I will always remember the pleasing remarks which accompanied the presentation, and how you have all supported me during this convention.

MR. BRAZIER: I do not desire to have this convention adjourn without saying a few words. In all probability, our good friend, Mr. Robert McKenna, may be the last man under the title of Master Car Builder who will occupy the office of President of this Association. Those of us who have been attending these conventions for the last twenty years knew his grand old father. How appropriate, how fitting it is that

Robert F. McKenna should follow in the footsteps of his illustrious father. I think the time is coming when the Master Car Builders' Association and the Master Mechanics' Association will be consolidated under one head, the tendency of the day being toward consolidation. I was on the nominating committee in company with Messrs. Lentz and Buker — past Presidents of this Association. We held a number of meetings before we were able to make a unanimous report, and as we have broken away from our time-honored custom, and have nominated motive-power men for Vice-Presidents, I am glad to say that the two present Vice-Presidents understand the reason why this was done, and there is nothing but the best feeling connected with it.

I was on the nominating committee that nominated Mr. Dow for President. Two years ago he wished to be dropped from the list of officers in succession for the presidency, but we induced him to hold on and go through, and, in behalf of the Association, I move that we extend a vote of thanks to Mr. Dow for his faithfulness to the duties of his office, and the satisfactory way in which he has discharged them during the past year.

MR. HENNESSEY: In seconding that motion, I may say that I am now getting to be among the older members of this Association. I think I can say with all candor there never was a man who has been President of the Association, who has worked more honestly and faithfully, and done more hard work in the interests of the Association, than our retiring President. [Applause.]

MR. FOWLER: I wish to add my voice in approval of the very effective manner in which Mr. Dow has filled the chair. He has rendered very efficient and valuable service to the Association during his term of office.

MR. SCHROYER: In line with what Mr. Brazier has just said, I would like to say a few words. I have been a member of this Association for twenty-two years. I think it is about forty years since this Association was first organized, and I have no idea in the world that the handwriting on the wall implies anything that is going to obliterate this Association, whether as the Master Car Builders' Association or Master Mechanics' Association, or whether it may be under some other title; but the objects and the aims of this Association have got to go forward as long as the general business of this country is extended between the States, and it will be extended between the States as long as this country remains a Union, just so long will this Association, whether it has the title it now possesses to-day or whether some other title may be bestowed upon it, continue to exist and perform the valuable service to the railroad interests of the country that it has performed in the past.

A point which is food for thought in this connection is this — that when this organization was first established, there were no set methods by which the cars of freight were interchanged between the different roads. At that time it was all transferred, or most of it was, to say the least. The railroad officers of the country realized how important it was that there should be some rules established whereby the cars could be interchanged, and that result was brought about by this Association. Do you know of any organization existing to-day, in which the business of the organization is conducted wholly on the confidence that we have in each other, to the extent that it is in the Master Car Builders' Association?

VOICES: No, No.

MR. SCHROYER: There is no organization in the world to-day where that is done. We take your cars from Maine to California, and you trust us with the operation and the maintenance of your cars, and when we say we have expended $10 on the maintenance of your car, you believe us and you pay the bill on the strength of the card that goes to you showing what work has been performed on that car. Is there any other organization in the country in which that is done?

I want to tell you, gentlemen, that we do not want to underestimate the influence and the power of this organization, and in so far as the objects that call us together are concerned, is there anything in the Master Mechanics' Association (which some of our members claim is going to absorb us), is there anything in their organization which equals in importance, from a practical standpoint, the objects to which we have given our attention? Is there any reason why this organization should be absorbed by that organization? Is there not every reason in the world why their organization should be absorbed by this Association? While it is true, in many cases, that as Master Car Builders we are subordinate to the Superintendents of Motive Power and the Master Mechanics, we might just as well have an organization called Superintendents of Motive Power Association, so I do not think that we should be disheartened simply because we may, in the near future, have to be united with the other Association. I think it would be a good thing to do, if we could take up the car business one day, and the next day what this road, and another road is using in locomotive practice — but which no two will use, and no two ever has used, and no two can use, because conditions are not comparable on different lines, and for that reason it can not be done — but, as I say, if we could alternate the discussions, dealing one day with the subjects which have generally been considered by the Master Car Builders and the next day with the subjects which have been considered by the Master Mechanics, the combination might prove to be a very good thing. We have established standards and have established conditions which the national law recognizes as being right and just, and on which Congress has based some of the Federal laws. I want to say, in view of all this, we should not feel disheartened. I believe there is still a career of great usefulness before an association dealing with the subjects which have been considered in our Association.

THE PRESIDENT: It has been regularly moved and seconded that a vote of thanks be extended to President Dow for his untiring efforts in presiding over the deliberations of this convention.

(The motion was unanimously carried.)

MR. SELEY: I move that a vote of thanks be extended also to the officers and executive members of the Association.

(Motion was seconded and carried.)

THE PRESIDENT: A meeting of the Executive Committee will be held on this platform immediately after adjournment.

The convention then adjourned.

MINUTES OF MEETING HELD IN CHICAGO, ILL., OCT. 1, 1907.

Present: J. J. Hennessey, Chairman; P. H. Peck, E. D. Bronner, T. W. Demarest, C. A. Schroyer.

ARBITRATION CASE NO. 720.

ALABAMA GREAT SOUTHERN RAILROAD COMPANY
versus
PENNSYLVANIA COMPANY — NORTHWEST SYSTEM.

REQUEST FOR HOME ROUTE CARDS.

STATEMENT OF ALABAMA GREAT SOUTHERN RAILROAD COMPANY.

On June 30, 1906, the Alabama Great Southern Railroad Company wrote to the Pennsylvania Company, Fort Wayne, Ind., requesting home cards for P. Y. & A. car 1071, on account of car having two draft sills broken and car therefore being unfit for revenue loading.

Instead of furnishing the home cards requested, the Penna. Co. asked that the car be delivered to the Pittsburgh, Cincinnati, Chicago & St. Louis Ry., at Cincinnati, but as the car was located at Meridian, Miss., and such handling did not conform with the route by which the car left home, the A. G. S. R. R. declined to deliver the car in the manner indicated, but renewed request for home cards.

The Penna. Co. declined to furnish the home cards on the basis that the defects mentioned did not constitute a condition of the car that would authorize a request for home cards under the M. C. B. rules. The A. G. S. R. R., not agreeing with this view of the case, insisted on receiving home cards, which cards were finally declined.

On June 24, 1907, the Penna. Co. requested that the case be referred to the Arbitration Committee for a decision, to which the A. G. S. R. R. consented under date of June 25, 1907.

This dispute appears to be as to what items of defects constitute a proper basis for requesting home cards, and as M. C. B. rule No. 125 covering the matter of "Sending home worn-out and damaged cars" does not give any list of items, and as no car gets in such condition by reason of damage, or age and decay, that it can not be made serviceable by proper repairs being made, it seems necessary to construe the rule mentioned as to extent of repairs that should be made by the railroad company having the car in its possession, and what extent of defects warrant the requesting of home cards from the owners.

In the absence of any definite items of defects being shown in the M. C. B. rules or any construction of same in this respect by the Arbitration Committee, we have been complying with the custom by furnishing home cards to other railroads for our cars having defects similar to defects existing on P. Y. & A. car 1071, and have also made requests for home cards for such items of defects on foreign cars. We therefore think it fair under such circumstances to assume that defects of the nature above mentioned, for which the owners are responsible, would warrant the requesting of home cards from the owners, but where combinations exist, the railroad having the car in its possession should make repairs.

The Penna. Co. claims that Arbitration Case No. 507 applies hereto, which we deny, as it appears to simply cover a dispute as to responsibility for certain defects, which point has not been brought up in the present dispute, as there is no question as to owners being responsible for the two broken sills in P. Y. & A. car 1071. We further believe that Arbitration Committee decision No. 162 would apply in this instance.

STATEMENT OF THE PENNSYLVANIA COMPANY.

The Alabama Great Southern Railroad Company, under date of June 30, 1906, asked for home route cards for P. Y. & A. car 1071, and gave as a reason that the above car was on its tracks at Meridian, Miss., with draft sills broken, the same unfit for revenue loading. On July 2, the Penna. Co. advised that, in place of sending car home under home-route cards, it be turned over to the Pan Handle for repairs. They would not do this, on account of the car being routed home over another route. Under date of July 21, 1906, the A. G. S. R. R. advised that this car routed home via Central of Georgia R. R. from Birmingham, Ala., and asked that home-route cards be sent covering the regular routing. To this reply was made under date of August 17, 1906, that the defects mentioned (as given in their letter of June 30) did not come under M. C. B. Rules 125 and 126, for which they could ask home-route cards, and we asked them to have the car repaired and returned to service.

Under date of August 18, 1906, the A. G. S. R. R. replied that this car had draft sills broken, and such being the case, it did not see that it was responsible, and asked that home-route cards be furnished. We replied to this under date of August 23, 1906, refusing to furnish the home-route cards, as the defects enumerated were not such that they could request home-route cards under Rules 125 and 126. Under date of September 6, the Alabama Great Southern advised that its request was duly made under the M. C. B. Rules, and was quite regular, stating that the defects on this car were such that repairs should be made before car was used under load "and, as they are properly chargeable to owners of car" stated it saw no reason why we should assume that the request was not properly made. To this reply was made under date of October 1, 1906, that the request was irregular, and refused to furnish home-route cards, and they had the alternative to either card it for the broken draft sills, or make the repairs to car, and, if an owner's defect, render bill against us.

In getting the routing of this car, it was found that it moved over the following lines: A. G. S. R. R. to the C. N. O. & T. P. Ry., Southern Ry. back to the C. N. O. & T. P. Ry., to the H. & N. E. R. R., to the Southern Ry., to the N. C. & St. L. R. R., to the Chattanooga Belt Ry., to the N. C. & St. L. R. R., to the Cent. of Georgia Ry., to the N. C. & St. L. R. R., to the C. N. O. & T. Ry., to the A. G. S. R. R., to the Cent. of Georgia Ry., to the Southern Ry., to the Southern R. R., to the P. & R. R. R., B. & L. E. R. R., and to the P. R. R. It would seem from this movement that the car could not have been in bad shape, and it is clear evidence that the car received a shock, although it did not bring it within a combination for which the handling company is responsible. It is quite evident that the car did receive some rough usage, in order to break the draft sills. If this was done in fair usage, the A. G. S. R. R. could have made the repairs, and charged the Penna. Co. for the same. Under Rule 125 of 1906 M. C. B. Code, the reading of the rule is in part as follows: " A car unsafe to load on account of general worn-out condition, due to age or decay, shall be reported to its owner, who must be advised of all existing defects. If the owner elects to have it sent home, he shall furnish two home-route cards, noting upon them existing defects, and the route over which the car is to be returned to its owner, etc." Rule 126: " A car which is safe to run, but unsafe to load on account of serious damage caused by wreck or accident, shall be reported to the owners for appraisement and disposition, and disposed of as provided in Rule 125, if the owner so elects."

The Penna. Co. contends:

First.— That request for two broken center sills does not mean worn-out condition.

Second.—That the car is a standard 34-foot Class G gondola car, none of which has ever been cut up on account of general worn-out condition, the only vacancies being due to cars wrecked and destroyed.

Third.— M. C. B. Rule No. 37 gives authority to the road handling the car to renew two broken center sills and charge repairs to the owner, providing the car was not damaged in accident, or any further damage that would form a combination. This is further borne out by Arbitration Case No. 507, dated April 19, 1898. Therefore, the proper spirit for the A. G. S. R. R. in this case should have been to repair the car without delay, and charge repairs to the owner.

Fourth.— Rule 125 clearly refers to cars unsafe to load, on account of general worn-out condition, due to age or decay, and particularly states that the owner must be advised of all defects existing. Two broken center sills is not sufficient to ask for home-route cards under this rule.

Fifth.— Rule 126 does not enter into the controversy unless there was further damage to car due to accident.

It would seem from this that it was a perversion of the rules in an effort to get the car home under home-route cards in order to avoid making repairs.

In the meantime the car was held at Meridian, Miss., for 139 days, during this controversy; the Penna. Co. holds that the request was irregular, and the car, if damaged in unfair usage, should have been repaired at the handling company's expense; if in fair usage, repairs should have been made and billed against the owner. The A. G. S. R. R. had no reasonable grounds under the M. C. B. rules to ask for home-route cards; it should pay per diem on the car, less a reasonable time for making repairs, which under the M. C. B. rules, is 38 hours.

Further correspondence failing to settle the dispute as to propriety of request for home-route cards, this matter is referred to the Arbitration Committee by agreement for decision as to whether the request was proper under the 1906 M. C. B. Code of Rules. On this fact hinges the payment of the per diem.

DECISION.

It is the opinion of your Committee that the request for home-route cards in this instance was not justified, but rather the repairs should have been made and the expense borne by either the car owner or the possessing company, according to the M. C. B. Rules.

On account of the apparent misunderstanding to a more or less extent of the proper use of the home-route card, your Committee embraces this opportunity to more clearly define Rules 125 and 126 (1906 Code), for the future guidance of railroad companies in general.

Rule 125 refers to cars in general worn-out condition due to age or decay. The character of repairs required may necessitate renewal of parts which the M. C. B. Rules do not allow at car owner's expense without first obtaining car owner's authority, as outlined in Arbitration Cases 465, 475, 521, 595; or it may be a case where car is so badly deteriorated as to make questionable the advisability of making any repairs. Car owner should have full information so he can intelligently dispose of the case, as the words " if owner elects " in Rule 125 give him the option in such cases. He may authorize repairs at his expense, or he may order destruction of car, or he may order car sent home, in which case home-route cards would be furnished.

Rule 126 refers to serious damage where the responsible party may feel that the car owner, account having the standard materials as well as proper facilities for handling the repairs on the peculiar construction of car, may be better fitted to make repairs at expense of party doing the damage. Should the car owner in its desire to hasten car back into service conclude to order car home and repair (although it is not compelled to make repairs under the M. C. B. Rules), it would furnish home-route cards. Rule 126 also provides for reporting seriously damaged cars for appraisement.

The proper interpretation of Rules 125 and 126, as above outlined, will show clearly that it is not in keeping with the spirit of the M. C. B. Rules to haul bad order cars all over the country on home-route cards (except in the extreme cases above specified), as such practice would subject the already weakened cars to further damage, as well as depriving them from earning any revenue while en route, and delaying the getting of car into service, all of which is foreign to the general spirit of the M. C. B. Rules and to good business principles.

Arbitration Case No. 162 has long since been abrogated through the embodiment of the combination defects into the M. C. B. Rules, which draw the line between fair and unfair usage, and which allow considerable leeway in the maintenance of cars at owner's expense — a feature which did not exist when decision 162 was rendered.

NOTE.—*Mr. Demarest being interested in the case was not a party to this decision.*

ARBITRATION CASE NO. 721.

PITTSBURGH & LAKE ERIE RAILROAD COMPANY

versus

CHICAGO GREAT WESTERN RAILWAY.

LUG BOLTS, DRAFT TIMBERS AND DRAFT SPRINGS DAMAGED,
RESPONSIBILITY FOR REPAIRS.

STATEMENT OF PITTSBURG & LAKE ERIE RAILROAD COMPANY.

Under date of November 22, 1906, the Chicago Great Western Railway Company made repairs to Pittsburgh & Lake Erie R. R. box car 1844, as per repair card stub attached. The repairs made to the car were as follows: " 10 lug bolts, 4 draft timber bolts, one 7-inch draft spring, one pair wheels, 2 solid journal bearings, and 4 oil-box bolts. Reason for repairs as noted on repair card, brasses worn out. Wheels O. K., axle bent. Brasses changed account of changing wheels."

Bill was rendered by the C. G. W. Ry. against the P. & L. E. R. R. for the lug bolts, draft timber bolts, and draft springs.

The P. & L. E. R. R. Co. took exception to the bill, claiming that the car had evidently received unfair usage. It was first alleged by the C. G. W. Ry. that no charge was made for oil-box bolts. However, after some correspondence between the two roads in interest, the C. G. W. Ry. agreed to eliminate from bill, which they had already made, the charge for oil-box bolts. The P. & L. E. R. R. still claimed that on account of the car having bent axle the bill for all repairs covering this car should be eliminated. It is admitted by the C. G. W. Ry. that the car suffered unfair usage as far as bent axle is concerned. The P. & L. E. R. R. Co. contends that repair card stub does not show but that all the defects occurred at the same end of the car; that even though a part of them may have been at the opposite end, Decision 709 is applicable to the case, and that whether it is a combination of defects or damage by rough usage the responsibility would be the same.

It is apparent that the car when derailed must have been the cause of the breaking of the oil-box bolts, draft springs, and other items, as the C. G. W. Ry has not presented evidence that the damage did not occur at the same time the axle was bent, and car derailed. Exception is taken to charge for bolts, 30-pound springs, and seven hours' labor.

Statement of Chicago Great Western Railway.

The Chicago Great Western Ry. admits that car was derailed: It was backed off siding track in yard at St. Joseph, causing axle to be bent. It applied a pair of wheels, also two brasses on account of misfit, and four oil-box bolts on account of old bolts being bent and rusted.

For these items no bill was rendered. When bill was first made up, the charge for oil-box bolts was inadvertently included on account of inexperienced bill clerk, but the charge was afterward eliminated. The contention is made that the charge for ten lug bolts, four draft timber bolts and draft spring should stand owing to the fact that these repairs have no connection with repairs made on account of bent axle, nor were they the resultant of the bent axle, as anyone will readily see.

Arbitration Case 709, quoted in substantiation of the argument of the P. & L. E. R. R. for the elimination of the charge, has no bearing on this case, as No. 709 covers a combination, while no combination existed in this case; the repairs made to the lug and draft timber bolts and spring were the natural consequence of ordinary wear and tear, and charge should stand.

The matter is respectfully referred to Arbitration Committee for decision.

DECISION.

It is the opinion of the Committee that the contention of the Pittsburgh & Lake Erie Railroad is in accordance with the provisions of the M. C. B. rules, and the bill therefore should be canceled.

Arbitration Case No. 722.

Monongahela Connecting Railroad Company

versus

Northern Central Railway Company.

POINT OF DELIVERY OF TRUCKS RETURNED FROM CAR DESTROYED.

On April 3, 1907, the body of Northern Central Railway car No. 359478 was destroyed on the line of the Monongahela Connecting Railroad, and owner asked that trucks and air brakes be shipped to N. C. Ry., Baltimore, Md. On April 11, the Monongahela Connecting R. R. advised that it had that day shipped as directed, and freight charges prepaid to Ormsby Station, Pittsburgh, Pa. Reply was at once made by the N. C. Ry., under date of April 13, 1907, to the effect that this would not constitute a full delivery, as freight charges should be paid to Marysville, Pa., which is the nearest junction point on the N. C. Ry.

The Monongahela Connecting R. R., in its reply of April 15, 1907, quotes Arbitration Case No. 706, P. R. R. vs. South Buffalo Railway Company, stating that precisely the same conditions exist in the relation of the N. C. Ry. with the Pennsylvania R. R. Co., and for this reason believes that delivery to Ormsby Station, Pittsburgh, Pa., complies with the present M. C. B. Rules.

The N. C. Ry. is unable to coincide with this view, or that Arbitration Case No. 706 covers a similar condition, claiming that the N. C. Ry. is not in any sense leased or operated by the Pennsylvania R. R., but has a separate organization with its own system of accounts, possesses and looks after its own equipment, has a separate representation in the M. C. B. Association, and in addition is required to pay freight at a rate not less than the regular tariff rate for material shipped over the Pennsylvania R. R., and in the present instance would certainly have to assume charges on the shipment in dispute between Ormsby, Pa., and Marysville, Pa., which would mean a distinct loss to the N. C. Ry., and which it believes the present rules are intended to protect. Further, it believes that this construction is amply covered by Arbitration Case No. 405, on the grounds that the N. C. Ry. is not controlled or operated by the Pennsylvania R. R.; neither is it leased or operated by that company in the sense outlined in Cases Nos. 182, 289, 379, 472 and 706. Under these circumstances, it asks for a reconsideration of the matter, and requests the Monongahela Connecting R. R. to arrange for prepayment of freight in question to Marysville, Pa.

The Monongahela Connecting R. R. in its reply of April 26, 1907, declines to change its position, referring again to Arbitration Case No. 706 — Pennsylvania Railroad vs. South Buffalo Railway Co. — which was decided in favor of the latter in part, for the reason that, as shown in the Official Railway Guide, the officers of the W. N. Y. & P. R. R. are the same as those at the head of the Pennsylvania R. R., with the exception of the Superintendent of Motive Power, and that precisely the same condition exists in the present relations of the N. C. Ry. It further denies that Case No. 405 covers the present question, as the decision was rendered in 1897, and conditions have since changed, and that the contention of the Pennsylvania R. R. at that time that the N. C. Ry. "owns and operates its own equipment" is no longer true, as its equipment is found in the *Railway Equipment Register* as Pennsylvania R. R. equipment.

Further, in Case No. 289 quoted, the Arbitration Committee gave as one of its reasons for deciding in favor of the W. N. Y. & P., "From the *Official Railway Equipment Guide*, it is found that the freight equipment of the Philadelphia and Erie, United Railroads of New Jersey and Pennsylvania Railroad Division, is all classified as Pennsylvania Railroad Equipment."

On page 17 of the *Official Equipment Register* for April, 1907, bills for repairs to N. C. cars are directed to be sent to J. S. Donaldson, Auditor Receipts and Accounts, Philadelphia, Pa.

Some of the N. C. equipment is shown in the *Equipment Register* under separate heading, but with the notation that they are being renumbered and reclassified.

Attention is also called to a statement made by Mr. A. W. Gibbs, Gen. Supt. Motive Power, that the financial relations of the B. & A. V. Division are practically similar to the P. B. & W. Railroad and Northern Central Railway, and a copy of letter received from Mr. Gibbs on this subject is offered as evidence, with a request that it be attached in support of the general statement made by the Monongahela Connecting R. R.

Again, on April 27, the Monongahela Connecting R. R. states that it received a letter from Mr. R. M. Patterson, Supt. Freight Transportation, P. R. R., in which he states: " All of the cars on Lines East, at present bearing the initials P. R. R., N. C. R., P. B. & W., etc., will be marked 'Pennsylvania' and initialed 'P. R. R.' and bear numbers 1 to 500,000, inclusive." Mr. Patterson also requests that instead of reporting any of the cars, 1 to 500,000, as N. C. R. cars, that they are to be reported under the initials " P. R. R.," and this is taken to be an official admission that N. C. R. cars have all been taken over by the P. R. R., and that the N. C. Ry. no longer possesses its own equipment.

The N. C. Ry. in final reply denies the foregoing allegations, and insists that the N. C. Ry. continues to own its own equipment to the same degree as formerly; in other words, the relations between the Pennsylvania R. R. and the N. C. Ry. are precisely the same as in 1897, and the pooling arrangement as mentioned by Mr. Patterson is simply a matter of transportation records, and is intended to facilitate the handling of these pool cars in service, while the earnings, repairs and all other details of the N. C. Ry. equipment are handled separately as required by the present organization, and while it is true that the cars are stencilled " Pennsylvania," the ownership marks, namely, " N. C. R." with the number following, are also plainly stamped on the end of each car as a matter of identification. The N. C. Ry. is further unable to see that the letter from Mr. Gibbs referred to has any bearing on the present case, and declines to include it as evidence.

Failing to agree, the matter is referred to the Arbitration Committee for a decision by mutual consent, this Abstract being signed by both parties at interest.

DECISION.

It is the opinion of the Committee that the delivery of the trucks of this car to the Pennsylvania R. R. at Ormsby Station, Pittsburgh, Pa., free of freight or other charges, constituted a delivery to the nearest point on the line of the company owning or operating the car as provided in Rule 122. The Committee believes this case to be similar to Case No. 706.

NOTE.—*Mr. Demarest being interested in the case was not a party to this decision.*

ARBITRATION CASE NO. 723.

PENNSYLVANIA RAILROAD COMPANY
versus
CHICAGO, BURLINGTON & QUINCY RAILWAY COMPANY.

POINT OF DELIVERY OF TRUCKS RETURNED FROM CAR DESTROYED.

STATEMENT OF PENNSYLVANIA RAILROAD COMPANY.

The Chicago, Burlington & Quincy Railway Company destroyed the body of Pennsylvania Railroad box car 90634 December 21, 1906, and made report of same December 24, 1906. On December 27, 1906, authority was given to ship the trucks to care of J. F. Courson, General Foreman, Pitcairn Shop, and on January 16, 1907, it advised that it would ship according to our instructions. Shipment was made and freight charges were only prepaid to Chicago. The Penna. Co. refused to forward from that point to Pitcairn without prepayment of freight charges to Pittsburgh. In order that shipment could go forward the C. B. & Q. Ry. people paid these charges, amount $39, and asked to be reimbursed for this amount, claiming that a delivery of this kind to a point on the Penna. Co. Lines constituted a free delivery to the car owners.

We declined to authorize this charge, claiming that when trucks from a destroyed Penna. R. R. car were delivered to any point on the Penna. Co. Lines, Northwest or Southwest System, they were not delivered to the company owning or operating the car in accordance with the Master Car Builders' Rules, and a delivery free of freight charges to the owner would only be made in this case when they were delivered to a point on the Penna. R. R., and further claim that Arbitration Cases Nos. 285 and 570 are parallel cases.

STATEMENT OF CHICAGO, BURLINGTON & QUINCY RAILWAY COMPANY.

On December 21, 1906, Pennsylvania Company car 90634 was destroyed on the line of the Chicago, Burlington & Quincy Railway, and in conformity with instructions from the Supt. Motive Power of the Penna. Co. the trucks were billed to Pitcairn, Pa., delivery being made at Chicago. Upon arrival at Chicago the trucks were refused until such a time as freight charges were paid over the P. C. C. & St. L. R. R., and as a means of avoiding delay to a car the freight charges were paid by a representative of the C. B. & Q. Ry. Co., amounting to $39. Upon refusal of the Penna. Co. to refund the above amount and failure of the parties to agree as to whether or not delivery to the P C. C. & St. L. R. R. is a delivery to the Penna. R. R. Co., the matter is respectfully submitted to the Arbitration Committee for decision.

STATEMENT OF FACTS BY THE CHICAGO, BURLINGTON & QUINCY RAILWAY COMPANY.

First.— On page 20 of the April, 1907, *Official Railway Equipment Register,* it is expressly set forth that Messrs. H. W. Mansfield and

Thomas Johnson are officers of both the Pennsylvania and the P. C. C. & St. L. companies.

Second.— On page 21, under the heading, "Pennsylvania Lines West of Pittsburgh," are shown new numbers for P. C. C. & St. L. cars, and when renumbered they are to be stenciled "Pennsylvania Lines" as explained on page 20.

Third.— On page 17, under the heading, "Pennsylvania Railroad," the P. C. C. & St. L. Line is included under the general instructions for handling per diem reports for the Pennsylvania System.

Fourth.— On page 25 under the heading, "Pennsylvania Lines West of Pittsburgh," there is shown a freight connection with the C. B. & Q. Ry. at Chicago.

ARGUMENT OF THE CHICAGO, BUBLINGTON & QUINCY RAILWAY COMPANY.

The fact that Messrs. H. W. Mansfield and Thomas Johnson hold positions with both companies is, in itself, evidence that the P. C. C. & St. L. is a Pennsylvania Line and must stand unless the contrary is fully established by other evidence.

The renumbering of P. C. C. & St. L. cars and marking them "Pennsylvania Lines" is holding out to the public and other railroad companies information that the cars are either owned or operated by the Pennsylvania Company, and if denied a detailed explanation is due.

The per diem instructions on page 17 emanate directly and unquestionably from the Pennsylvania Company proper, and being documental evidence can not be refuted.

On account of the fact that one of the Pennsylvania Lines, the P. C. C. & St. L. R. R., shows a connection with the C. B. & Q. Ry. at Chicago, delivery of the trucks at Chicago was sufficient.

Rule 122 states that the trucks shall be forwarded "free of freight or other charges, to the nearest point on the *line* of the company owning or operating the car," and a careful reading reveals the fact that it was not the intention of the framers of this rule that the *ownership* of the *line* should be considered, as this would necessitate unnecessary and very searching inquiries into the conditions under which great railroad systems are operated. The rule, therefore, refers to the line of the company, whether owned or otherwise, and to hold that the P. C. C. & St. L. is not a Pennsylvania line is to contend that it is a Pennsylvania line for the purpose of renumbering equipment, handling per diem accounts, freight connections, etc., but not for the purpose of receiving trucks.

The case is submitted in the light of Decision No. 706, and changes in conditions that have taken place since the date of all former decisions bearing upon the same point. Having established the fact that the *Official Railway Equipment Register* shows the P. C. C. & St. L. R. R. as a Pennsylvania Line, further evidence in support of our position is not necessary, and we contend that the burden of proving otherwise rests upon the latter company.

DECISION.

It is the opinion of the Committee that the P. C. C. & St. L. Ry. is a separate and distinct organization from the Penna. R. R. Co., and that the former road is in no way connected with the ownership or operation of the car in question, and that the contention of the Penna. R. R. Co. that the trucks should be delivered free of freight or other charges at Pittsburgh, Pa., is in accordance with the provision of Rule 122.

NOTE.—*Mr. Demarest being interested in this case was not a party to the decision.*

JOS. W. TAYLOR,
Secretary.

MINUTES OF MEETING OF ARBITRATION COMMITTEE,

Held in Chicago, Ill., April 28-29, May 6-7, 20, 1908.

Present, J. J. Hennessey, Chairman; P. H. Peck, T. W. Demarest, E. D. Bronner, C. A. Schroyer.

ARBITRATION CASE NO. 724.

NEW YORK, ONTARIO & WESTERN RAILWAY COMPANY

versus

DELAWARE, LACKAWANNA & WESTERN RAILROAD COMPANY.

MALLEABLE COUPLER APPLIED, TO CAR, RESPONSIBILITY FOR.

STATEMENT OF DELAWARE, LACKAWANNA & WESTERN RAILROAD COMPANY.

All Delaware, Lackawanna & Western Railroad Company's freight train cars are stenciled "M. C. B. pocket couplers." October 26, 1907, the New York, Ontario & Western Railway Company had occasion to change couplers on one end of D. L. & W. 60077, an 80,000-pound capacity gondola car, account coupler body broken, and in making repairs it used a malleable coupler and charged car owners for same.

The D. L. & W. R. R. Co. admits that a malleable coupler was removed, but it claims that no charge should be made by the N. Y. & W. Ry. Co. for following reasons:

1. That car being stenciled "M. C. B. pocket coupler" plainly indicated that steel couplers were standard to it, as the malleable coupler is not an M. C. B. standard.

2. That the circular issued by the Arbitration Committee October 1, 1907, is a decision of that Committee, and that it plainly prohibits the use of malleable couplers in any freight train cars unless such cars are stenciled for malleable couplers.

3. That it has purchased nothing but steel couplers for use on either its own or foreign cars during the last five years, and that it has taken every possible precaution to maintain steel couplers in its equipment.

The D. L. & W. R. R. Co. believes that when any company making repairs to a car that is not stenciled for malleable couplers uses malleable couplers in making such repairs, no charge should be made against car owner for either material or labor, and that defect cards covering wrong repairs can not be used to adjust such matters, for the reason that a malleable coupler, no matter in what condition it may be, is of only scrap value, and the road applying it has the scrap from the coupler they removed.

STATEMENT OF THE NEW YORK, ONTARIO & WESTERN RAILWAY COMPANY.

The M. C. B. malleable iron vertical plane coupler has been used successfully, and up to the present time has been standard on all New York, Ontario & Western Railway equipment, and until the present rules of interchange were effective, September 1, 1907, couplers made of malleable iron were M. C. B. standard.

The car in question — D. L. & W. 60077 — was built prior to September 1, 1907, and consequently, car being stenciled "M. C. B. couplers" did not signify that the car was originally equipped with a steel coupler.

The car came to this road with malleable couplers, one of them broken, and we applied a standard M. C. B. malleable coupler, and our contention is that the car should have been stenciled "M. C. B. steel couplers" to have made this company responsible for using a malleable coupler.

The ruling of the Arbitration Committee has always been that a coupler made of steel should be stenciled "steel." As neither coupler on this car was marked "steel" or the car stenciled "steel couplers," the fact of the car being built prior to September 1, 1907, and we having no knowledge that steel couplers were standard on the D. L. & W. R. R. Co. or standard to this car, we should not be held responsible for substituting steel couplers in place of malleable iron couplers not applied by this company, and we claim that we did not make the wrong repairs to this car.

DECISION.

The New York, Ontario & Western Railway Company makes the statement that the car came to it with malleable automatic vertical plane couplers, and this being the case, it had no way of knowing that steel M. C. B. couplers were standard to the car. It did only the natural thing in replacing a broken malleable coupler with one of same material, and in so doing complied in so far as they were able to determine, with material which conformed with the original construction of the car, according to Rule 59, and can not, therefore, be held responsible for wrong repairs.

The stenciling "M. C. B. pocket coupler" was applied to cars when M. C. B. couplers were made of malleable iron, and this stenciling is therefore no guide to foreign companies that steel M. C. B. couplers are standard to the car.

NOTE.—The Arbitration Committee will recommend that after September 1, 1908, steel couplers must be used.

ARBITRATION CASE NO. 725.

CENTRAL RAILROAD OF NEW JERSEY

versus

DELAWARE, LACKAWANNA & WESTERN RAILROAD COMPANY.

5 X 5 SHANK COUPLER APPLIED IN LIEU OF 5 X 7 SHANK COUPLER STANDARD TO THE CAR.

STATEMENT OF CENTRAL RAILROAD COMPANY OF NEW JERSEY.

On August 19, 1907, C. R. R. of N. J. inspector at Hampton, N. J., removed from D. L. & W. car 61475 a broken 5 by 7 inch shank coupler and applied a 5 by 5 inch M. C. B. standard coupler. The Central Railroad of New Jersey billed the owners for a new 5 by 5 inch coupler less scrap, 5 by 7 inch body and secondhand parts.

The Delaware, Lackawanna & Western Railroad Company took exception to the charge, claiming wrong repairs, as a 5 by 7 inch coupler was standard to the car.

The C. R. R. of N. J. contends:

1. That 5 by 5 inch couplers are M. C. B. standards; acknowledged as such, they are of sufficient strength for any capacity car.

2. By applying a 5 by 5 inch coupler the strength was not impaired.

3. It refers to Arbitration Case 672, which it considers parallel, inasmuch as during the controversy it was stated that railroad companies were placing this size (5 by 5 inch) under 50-ton cars.

The car reached home in good condition, and we are of the opinion the charge is a proper one and should be paid.

STATEMENT OF DELAWARE, LACKAWANNA & WESTERN RAILROAD COMPANY.

D. L. & W. R. R. steel gondola 61475 (80,000 pounds capacity) stenciled for M. C. B. coupler with 5 by 7 inch shank, had a coupler of this type broken while it was being handled by the C. R. R. of N. J., and in making repairs the C. R. R. of N. J. used a coupler having a shank 5 by 5 inches and billed car owners for same, using prices provided by M. C. B. rules.

The D. L. & W. R. R. Co. objected to charge, claiming that wrong repairs had been made for the following reasons:

1. 5 by 7 inch shank couplers are M. C. B. standard.

2. When cars are stenciled for any particular size of shank, that size must be used in making repairs, provided they are M. C. B. standards, or, in other words, the original construction of a car must not be interfered with.

3. That the substitution of a 5 by 5 inch shank coupler in a car originally equipped with a coupler having a 5 by 7 inch shank impairs its strength.

The D. L. & W. R. R. Co. claims that charge should be cut out of bill, or in case charge was made, that M. C. B. defect card should be issued covering improper repairs.

The C. R. R. of N. J. claims that repairs were proper and that rules justified charge, and as a mutual understanding could not be arrived at it is decided to refer the case to the Arbitration Committee for decision.

DECISION.

It is clear from the statement of the car owner (D. L. & W. R. R. Co.) that the car was stenciled to show that M. C. B. couplers with 5 by 7 inch shank were standard, and this being the case, the C. R. R. of N. J. made wrong repairs in applying M. C. B. 5 by 5 inch shank coupler. Where a railroad or private line goes to the expense of equipping its cars with the 5 by 7 inch shank M. C. B. coupler, and so stencils its cars to show that such size is standard to same, it would be manifestly unjust to allow deviation from this standard. It is the opinion of the Committee, therefore, that the C. R. R. of N. J. defect card should be furnished to the D. L. & W. R. R. Co., covering the difference in the price of couplers and the cost of applying same.

ARBITRATION CASE NO. 726.

MILWAUKEE REFRIGERATOR TRANSIT COMPANY

versus

ST. LOUIS, SAN FRANCISCO & TEXAS RAILWAY COMPANY.

REPAIRS OF OWNER'S DEFECTS CLAIMED NOT MADE.

STATEMENT OF ST. LOUIS, SAN FRANCISCO & TEXAS RAILWAY COMPANY.

On May 12, 1906, two M. C. B. brake shoes were applied to "B" end of M. R. T. Co. car 4065 on account of worn out.

On August 13, 1906, two side handholds reset account loose; three lag screws ½ by 4 inches account gone; one Chicago knuckle lock and one lift chain broken, "B" end.

On June 11 we applied one Chicago knuckle to "A" end of M. R. T. Co. car 4013 account of knuckle broken.

On August 10, 1906, one solid Chicago knuckle, one lift lever casting and one lift chain clevis were applied account of broken; two lag screws ½ by 4 inches were applied to "B" end of M. R. T. Co. car 4029 account lost.

These repairs were all made at our Fort Worth shop as attested to by the car foreman and car inspector.

On May 25, 1906, we applied to M. R. T. Co. car 4218 one 8-inch solid brass at "A" end account worn out; one M. C. B. brake-shoe key, and one end grabiron "B" end account gone; two 5 by 7 inch truck springs, one coupler hand rod at "B" end broken. On June 1, 1906, we applied to the same car one new Chicago solid knuckle "A" end account broken; two end grabirons; four lag screws ½ by 4 inches "A" end account gone; two M. C. B. reinforced brake shoes worn out; one bottom rod repaired; one 1¼-inch air hose worn out; one coupler hand rod repaired; eleven lag screws ½ by 4 inches gone at "B" end of car; one 1¼-inch air hose account bursted; one 8-inch solid brass account worn out; two M. C. B. reinforced brake shoes worn out, and one coupler hand rod missing at "A" end.

On May 12, 1906, we applied to M. R. T. Co. car 4274 one new Chicago knuckle account broken; two M. C. B. brake shoes account worn out at "A" end of car.

July 9, 1906, we applied to M. R. T. Co. car 4030 two M. C. B. reinforced brake shoes account worn out; one 8-inch M. C. B. solid brass account worn out at " A " end of car; one dead lever guide repaired account broken; one coupler hand rod applied account gone to " B " end of car.

These repairs were made at our Sherman shop and were made in good faith as attested to by the car foreman and car inspector.

Bills were rendered against the M. R. T. Co., for repairs of these cars, in August and September, 1906.

On February 23, 1907, the M. R. T. Co. rendered rebuttal bill, No. 650, against the St. L. S. F. & T. Ry. Co. for $18.25, supporting its claim with joint evidence cards signed by the inspectors for M. R. T. Co. and Chicago, Milwaukee & St. Paul Railroad Company, stating that repairs were not made.

In the case of car 4218 it was 4 months and 17 days from the time repairs were made until joint evidence card was made out. In case of car 4274 it was 5 months; in case of car 4030 it was 3 months and 20 days; in case of 4013 it was 4 months and 18 days; in case of 4065 it was 5 months and 17 days from time repairs were made until inspected, in one case, and 3 months and 7 days in the other, and in case of 4029 it was 3 months and 4 days from time of repairs until inspected.

The St. L. S. F. & T. Ry. Co. refuses to pay the bill of the M. R. T. Co., claiming that the repairs were made in good faith and that joint evidence cards are not authority for bill in claims of this kind, as it is the intent of the M. C. B. Association that joint evidence cards be used in case of wrong repairs only. Furthermore, the length of time that elapsed between the dates of repairs and the issuance of the joint evidence cards was so long that it would be impossible for any inspector to say, with any degree of certainty, that repairs had not been made.

We furnish affidavits from our car foremen and car inspectors that repairs were actually made, and respectfully ask that the bill of the M. R. T. Co. be cancelled.

This is parallel case to Arbitration Case 682.

STATEMENT OF MILWAUKEE REFRIGERATOR TRANSIT COMPANY.

By referring to repair cards which were returned with our affidavit September 6, 1907, the repairs and dates of the repairs on the car numbers given below and billed against the Frisco in our bill No. 650, can readily be seen:

Car 4030. 1. Inspection made October 18, 1906. There were no reinforced brake shoes on the car, but cast brake shoes and our own original Streeter shoes which were applied in our yard. 2. The journal on this car is 4¼ by 8 inches. Therefore, a 7-inch brass could not have been applied, as claimed. 3. Both the dead lever guide and the hand rod were still on the car, which had been applied by the Pullman Co. when the car was built.

Car 4218. 1. Inspection made October 11, 1906. Our original patent brake shoes were still on the car, also our original grabirons, bottom rod, and hand rod, which were applied by the Pullman Co. when the car was built, were still on the car. 2. Air hose was applied July 25, 1904, by the Rock Island Ry., and was still on. 3. Our original More-Jones brasses were still on the car. 4. There were no 5 by 7 inch truck springs on the car, but our own springs, which measure 5¼ by 8 inches.

Car 4274. Inspection made October 10, 1906. Our original patent brake shoes still on the car.

Car 4065. Inspection made August 8, 1906. Our own original patent brake shoes still on car.

Car 4013. Inspection made August 28, 1906. An old secondhand knuckle was on the car.

Car 4065. Inspection made November 20, 1906. Original grabiron and lift chain still on the car.

Car 4029. 1. Inspection made August 28, 1906. Our own original solid knuckle with dates cast, of which we hold a record and numbers stamped on the back, still on. 2. Original lift lever casting still on the car.

For all of which we attach joint evidence cards and affidavit from our inspection, as well as the C. M. & St. P. Ry. inspector. As the Frisco did not comply with the M. C. B. rules and apply repair cards to cars when repairs were claimed to have been made, the cars above were not inspected until bill was rendered against us and the cars had returned home, therefore the delay in inspection.

DECISION.

In every case of repairs claimed to have been made by the St. L. S. F. & T. Ry. Co. to M. R. T. Co. cars, the car owner has entered a direct denial, and offers joint evidence cards as well as affidavits to sustain such denials.

The St. L. S. F. & T. Ry. Co. make the positive statement that the repairs were actually made in each and every case, and it also offers affidavits from the car foreman and inspector to substantiate such statements. Affidavits in cases of this kind are superfluous from either side, as the M. C. B. rules do not require them.

This controversy is similar to that considered in Arbitration Case 682, and your Committee can only reiterate what was said at that time, namely: that the party repairing car makes the positive statement that the repairs were actually made, and their bill should therefore be honored.

Your Committee might state here that the whole basis of the rules of interchange — the idea itself — is based upon the facts that all railroad companies are honest, as without honesty slid flat wheels, cut journals, bent axles, etc., would never be reported as existing upon a foreign car, and the whole plan would be nothing more nor less than a farce.

ARBITRATION CASE No. 727.

ST. LOUIS & SAN FRANCISCO RAILROAD COMPANY
versus
SOUTHERN PACIFIC COMPANY.

TWO DRAFT TIMBERS AND DEADWOOD APPLIED, PROPER CHARGE FOR.

STATEMENT OF FACTS.

The St. Louis & San Francisco Railroad Company rendered various bills against Southern Pacific Company for car repairs containing charges covering application of two draft timbers and deadwood to certain cars, same time, same end of car, making a labor charge therefor of thirteen hours — ten hours for application of two draft timbers and three hours for application of deadwood.

S. P. Co. objected to these charges, claiming that, in accordance with Arbitration Decisions 670 and 693, charges made by the St. L. & S. F. R. R. Co. should be reduced by one hour per car, or, to twelve hours for replacing two draft timbers and deadwood, same time, same end of car, which is in line with decision in Case 693, previously referred to. This, the St. L. & S. F. R. R. Co. refuses to do, and, in order to facilitate passage of their bills containing the charges objected to by S. P. Co., eliminated such objectionable charges from original bills, making them the subject of a separate bill, their Audit No. 130336, amount $35.64, and ask that statement be prepared covering the dispute, for submission to the Arbitration Committee.

SOUTHERN PACIFIC COMPANY'S ARGUMENT.

While it is true that Rule 106 allows ten hours for replacing two draft timbers, and three hours for replacing deadwood, we maintain that, in view of decisions in Cases 670 and 693, we are to accept these charges only in cases where either item is replaced alone; that where, as in the present case, the renewal or replacement of one item contributes to the renewal or replacement of the other, an equitable reduction in the combined labor charge should be made.

We assert that the principle involved in the present case is identical with that in Cases 670 and 693, namely, that it is the spirit of the M. C. B. rules to refrain from making full labor charge for each item when the labor specified for one is sufficient to wholly or in great part cover both.

In order to replace draft timbers it is necessary to remove and apply certain bolts which pass through draft timbers and deadwood, charge for which is included in the labor allowed for replacing draft timbers alone; and, vice versa, in replacing deadwood, it is necessary to replace these same bolts, charge for which is included in labor allowed for replacing deadwood alone. We refer to carrier iron bolts, and these must be partially or wholly removed in replacing either draft timbers or deadwood.

The St. L. & S. F. R. R. Co. is the only railway company with whom we are doing business, and with whom this particular point has been raised, that has not, or does not concede the correctness of our position in the matter, namely, that the following, under decisions quoted above, is an equitable and proper charge for this work:

9 hours for replacing one draft timber and deadwood,
12 hours for replacing two draft timbers and deadwood,

when the work in connection with both items is done at same time, same end of car.

In order that a clear understanding may be had on this point, we respectfully ask that you render a decision indicating proper charge for this work.

ST. LOUIS & SAN FRANCISCO RAILROAD COMPANY'S ARGUMENT.

We note that the Southern Pacific Co. admits that M. C. B. Rule 106 authorizes a charge of ten hours' labor for replacing two draft timbers, and three hours' labor for replacing one deadwood, and also note that this same rule makes no provision that only such charges are to be made when either item is replaced alone.

We agree that the decisions rendered by the Arbitration Committee in Cases 670 and 693 contain a clause suggesting that it be borne in mind that it is the spirit of the M. C. B. rules to refrain from making full labor charge for each item when labor specified for repairing one item is sufficient to cover the others, but also note that this particular clause, when embodied in decision rendered in Case 670, was evidently not construed by the S. P. Co., or any other railroad company, to have any bearing on the labor charge to be made when applying draft timbers and deadwood at the same time, as full charge allowed by the rules was made for this class of work in all bills rendered by them, and there was no question raised as to the correctness of such charge until the decision in Case 693 was rendered.

We contend that when replacing the draft timbers, the reduction in labor in applying a deadwood at the same time is not sufficient to cut the charge to two hours. It is only necessary to remove the nuts from four carrier iron bolts to take down the timbers, and drift two carrier iron bolts up even with the bottom of the deadwood to apply the timbers when not replacing the deadwood. If the deadwood is applied at the same time, there are four carrier iron bolts which have to be drifted up even with the bottom of the deadwood, and not only to the bottom, but driven clear through. It is also necessary to drift out the four deadwood bolts passing through the end sill on a certain class of equipment and to remove the lift rod casting and lags before the deadwood can be removed, all of which will require more than enough time to offset the reduction account removing the nuts from the carrier iron bolts and drifting the two bolts to the bottom of the deadwood when not renewing same; especially is this true when the old deadwood and carrier iron bolts are bent and twisted, in which case it is a tedious job to remove them, and, after their removal, they must be straightened before being replaced. Where cars are not equipped with deadwood bolts it is necessary to remove the nuts from the end of the truss rods and remove the deadwood plate in addition to removing the carrier iron bolts and lift rod casting and lags before the deadwood can be removed. When the deadwood is damaged the deadwood plate must necessarily suffer a certain amount of damage which, in nearly all cases, is sufficient to require straightening before it can be reapplied to the deadwood. Taking into consideration the amount of labor involved in renewing the deadwood, it can be clearly seen that three hours is not excessive for the work, either when applying singly or with timbers.

The claim of the S. P. Ry. Co. that a reduction of one hour in line with decision in Case 693 is made, merely on account of such decision applying indirectly to work performed in connection with renewing the deadwood, as in the case of renewing coupler and carrier iron bolts, for the reason that removing the nuts from the carrier iron bolts is a part of the operation performed in both instances.

We hold that the fact that our method of making full labor charge, as prescribed by the rules when renewing draft timbers and deadwood, has also been the method of all other roads in the past (even in the face of the decision in Case 670), is sufficient proof that the charge is just and equitable, otherwise it would have been proven before this that there was a reduction of one hour necessary in order to arrive at the proper labor charge as now claimed, and do not believe that it was the intention of the Committee, when rendering its decision in Case 693, that there would be an attempt to apply as broad a construction to same as has been done by the S. P. Co. in this case. In rendering decision, would also request the Committee to allow same to apply to the charge for applying couplers and deadwoods at the same time, as similar claim is made, namely, that two hours only should be charged when applying deadwood and coupler on account of it being necessary to remove the carrier iron.

DECISION.

In our opinion, neither of the cases quoted — Cases 670 nor 693 — are parallel cases, but Case 630 (not quoted) is an exactly similar case. The contention of the St. L. & S. F. R. R. Co. that the deadwood and draft timbers are not so closely associated that when the two draft timbers and the deadwood are removed at the same time the removal of one contributed materially to the removal of the other, is, in the opinion of the Committee correct, and that as decided in Case 630, above referred to, full labor charge should be allowed.

ARBITRATION CASE NO. 728.

SWIFT REFRIGERATOR TRANSPORTATION COMPANY

versus

TEXAS & PACIFIC RAILWAY COMPANY.

HIDDEN DEFECTS AND WRONG REPAIRS, RESPONSIBILITY OF INTERMEDIATE ROAD.

STATEMENT OF SWIFT REFRIGERATOR TRANSPORTATION COMPANY.

On December 7, 1906, the Texas & Pacific Railway Company delivered to the Swift Refrigerator Transportation Company, at Fort Worth, Texas, S. R. L. car 2592, with the following defects:

1 side sill broken	A end.
2 draft sills broken	"
2 intermediate sills broken	"
1 end sill broken	"
2 body truss rods broken	"
1 draft lug broken	"
1 draft timber broken	"
1 carrier iron broken	"
1 deadwood broken	"
1 angle iron broken	"
1 lifting rod casting broken	"
18 pieces hard pine siding applied to car instead of spruce siding.	
1 corner band missing.	

The two broken intermediate sills and one of the broken draft sills had been slabbed with 2 by 5 inch by 6 foot oak, one on each side of the sill, and the other draft sill had been improperly spliced.

The S. R. T. Co. requested joint inspection on this car before repairs were started, which was made by representative of the T. & P. Ry. Co. and the S. R. T. Co.; representative of the T. & P. Ry. Co. authorized the S. R. T. Co. to proceed with the repairs.

After the car was stripped for repairs, the T. & P. Ry. Co.'s car foreman and chief joint car inspector made another inspection, which was found to agree with the first inspection (made before the car was stripped for repairs). Accordingly, on December 12, 1906, the S. R. T. Co. presented to the T. & P. Ry. Co., through the chief joint car inspector at Fort Worth, Texas, a request for M. C. B. defect card for defects described above. The T. & P. Ry. Co. declined to issue M. C. B. defect card, claiming the damage did not occur on their line. They were, therefore, not responsible. The T. & P. Ry. Co. would, however, trace for the purpose of locating where the damage was done.

From the correspondence, it is noted that the Master Mechanic of the T. & P. Ry. Co., at Gouldsboro, La., wrote to the Master Car Builder, at Marshall, Texas, on March 23, 1907, that S. R. L. 2592 was loaded by them on November 17, 1906, and car was then in good condition. In subsequent correspondence, chief joint inspector at Fort Worth, who examined the car and who represented the T. & P. Ry. Co. at that point, admits that under the M. C. B. rules, there was a combination of defects denoting unfair usage, and the S. R. T. Co. was entitled to M. C. B. defect card.

The correspondence also contains letters from the Illinois Central and Southern Pacific Companies' inspectors at New Orleans, both of whom claim that car did not show any evidence of damage when passed by them to the T. & P. Ry. Co.

The T. & P. Ry. Co. declines to authorize M. C. B. defect cards, claiming that the damage did not occur on their line, and they are not, therefore, responsible.

The S. R. T. Co. contends that, under the M. C. B. rules, the T. & P. Ry. Co. (which was the delivering line), is responsible, and should issue M. C. B. defect cards for the damage. It is not material in this particular case whether the damage occurred on the delivering line or not; the delivering line should have protected itself by its inspection at the receiving point from their connection, and that the car owners must not suffer by reason of neglect or oversight on the part of the delivering line's inspectors, if they fail to obtain protection from their connections when receiving cars in damaged condition.

STATEMENT OF TEXAS & PACIFIC RAILWAY COMPANY.

The Illinois Central Railroad delivered S. R. L. car 2592 to the Texas & Pacific Railway Company, at New Orleans, on November 16, 1906, at which time car was apparently in good condition.

The car moved to Longview Junction and was delivered to the International & Great Northern Railroad November 21 (no exceptions), and was returned by them on November 22 (no exceptions), and then moved over the T. & P. Ry. to Fort Worth, where it was delivered to the Fort Worth Belt on November 30, 1906 (this being the only movement of said car over this line during the year 1906), at which time car was inspected, and record of the chief joint inspector shows:

"One draft sill and deadwood broken (old) A end."

On December 8, 1906, the chief joint inspector made another inspection of the car, after it was stripped at the Southwestern Mechanical Company's shops, at Fort Worth, record of this inspection being as follows: 1 side sill, 2 draft sills, 2 intermediate sills, 1 end sill, 2 body truss rods, 1 draft lug, 1 draft timber, 1 carrier iron, 1 deadwood, 1 angle iron, 1 lift rod casting — broken A end, 150 pieces hard pine siding, should be spruce siding, 1 corner band.

The two intermediate sills and the one draft sill had been slabbed with 2 by 5 inch by 6 foot oak, one on each side of sill; and one draft sill had been spliced improperly. One side sill was broken.

The T. & P. Ry. Co. car foreman was present when this (second) inspection was made, but was not present when the car was first inspected, at time of delivery to the Fort Worth Belt, nor did he assist in the first inspection; and the T. & P. Ry. Co. deny that part of the S. R. T. Co.'s statement wherein they assert that the second inspection was found to agree with the first inspection (made before car was stripped for repairs).

This car was partially repaired somewhere, and the damage and wrong repairs were concealed by the false flooring, making it a matter of impossibility for any inspector to detect same; and although car passed several junction points none of the inspectors noticed the defects and wrong repairs, and same were not discovered by the chief joint inspector at Fort Worth at the time of delivery to the Fort Worth Belt (prior to being dismantled).

The T. & P. Ry. Co. has shown that no improper repairs were made to this car, nor was the car in any trouble whatever while on its line; however, it took the matter up with its connections, and endeavored to locate the line that damaged and partially repaired the car, and both the Illinois Central and S. P. inspectors, as well as their own inspectors, state the car did not show any evidence of being damaged.

The T. & P. Ry. Co. claims it can not be held liable for sills broken and slabbed, and concealed by false flooring; soft-wood end sill applied in place of hardwood, and hard pine siding instead of spruce; and it declined to furnish defect card for the hidden defects and wrong repairs to this car, which was neither damaged nor repaired while on its rails. Furthermore, it claims it is not the intention of the M. C. B. rules to hold an intermediate road responsible for concealed defects and improper repairs (not made by them) and cites Cases Nos. 396 and 707 as parallel.

Failing to agree in the points at issue, the matter is respectfully referred to the Arbitration Committee for settlement.

DECISION.

There is no question but that wrong repairs were made to this car and that defects existed which themselves formed a combination. In the case of wrong repairs the rules plainly state that the road making such repairs is solely responsible to the owner, and as the T. & P. Ry. Co. did not make these repairs it can not be asked to furnish a defect card to cover. In so far as the combination of defects indicating rough handling is concerned, if detected by inspection, they would become a delivering company's responsibility. The inspection record of the chief joint inspector, as noted above, however, under date of November 30, 1906, indicates no defects except one draft sill and one deadwood, broken (old) at A end, which damage in itself is not a combination. As the car was duly received from the T. & P. Ry. Co. by the chief joint inspector on this notation, his inspection record of the condition of the car at the time he received it must be assumed to be the actual condition of the car.

In our opinion, therefore, the request for defect card as made by the

Swift Refrigerator Transportation Company on the Texas & Pacific Railway should be canceled.

ARBITRATION CASE NO. 729.

PERE MARQUETTE RAILROAD COMPANY

versus

LEHIGH VALLEY RAILROAD COMPANY.

STATEMENT OF THE PERE MARQUETTE RAILROAD COMPANY.

1. Pere Marquette Railroad car 30366, loaded with flax by J. M. Steinhoff, of Wallaceburg, Ontario, was covered by Wallaceburg to Suspension Bridge Way-bill, Series L-7, of February 1, 1906, consigned to Smith & Dover, Andover, Mass., via L. V. R. R.

2. The above-mentioned car was delivered to the L. V. R. R. at Suspension Bridge on February 3 in good condition (except five Butler castings or cross bolts broken), and no exceptions taken to the car by the L. V. R. R. when car was received by them.

3. This car was held by the L. V. R. R. from February 3 until February 13, when it caught fire from some cause unknown to owners and the roof and the entire body of the car above the sills was destroyed.

4. The question of liability for damage to the car was taken up with the L. V. R. R. officials, and in reply they declined to assume responsibility, claiming the P. M. R. R. Co. was responsible on account of not furnishing owners' declaration covering shipment at the time the car was delivered to them.

5. The P. M. R. R. Co. takes the position that the L. V. R. R. Co. is responsible for the damage to this car, as it had been in its possession for a period of ten days and no effort or attempt had been made to return the car to the P. M. R. R. Co.

6. The P. M. R. R. Co. holds that the receiving company's statement No. 4 has no bearing on this case, and does not in any way affect the actual delivery of the car to the L. V. R. R. or its responsibility for the safety of the car while in its possession.

7. The receiving company's statements Nos. 5 and 6 that the car was condemned for transfer account of broken draft timber bolts, and that the car could not be transferred until "Hold for Customs" tags had been removed. If this statement was correct it would not relieve the receiving company from responsibility, as the fact remains the car was in its possession and was damaged while on its tracks, and it is responsible under M. C. B. rules to the owners. I wish to say, however, that when this car arrived at our shops, there were no up and down draft timber bolts broken, but five cross Butler castings bolts, which could have been applied without transfer of the load, and no draft bolts had been applied to the car after it was damaged by fire.

8. The P. M. R. R. Co. hold that Car Service Rule No. 5, as mentioned in receiving company's statement No. 9, has no bearing on this case, and does not in any way affect the responsibility of the receiving company. The car was in its possession, had remained there for ten days; it had given the P. M. R. R. Co. no notice that it would not accept the car, or return it to the P. M. R. R. Co., consequently, is liable for the damage.

9. Referring to the receiving company's statement No. 8, that the P. M. R. R. Co.'s agent directed that the car be returned to the P. M. R. R. Co. in order that contents could be reconditioned, and placed in proper order for forwarding to destination, the P. M. R. R. Co.'s agent gave these instructions in good faith, with no intention that such action would relieve the receiving company of any liability for damage to the car, but for the purpose of putting the contents of the car in such condition so that as much as possible of it could be saved, and thereby reduce the loss as much as possible.

10. The claim made by the receiving company that the P. M. R. R. Co. had not effected a delivery of the car to the L. V. R. R. Co. on account of certain customs papers not having been furnished, the P. M. R. R. Co. holds that the failure to deliver the customs papers at the time the car was switched to the L. V. R. R. Co. does not affect the actual delivery of the car. If, for any reason, the car was not accepted, the P. M. R. R. Co. should have been notified, and the car turned back to them.

11. The P. M. R. R. Co. believes that it has established, beyond any question of doubt, that this car was actually delivered to the L. V. R. R. Co., and that it had accepted it, and same would have been forwarded toward its destination as soon as customs papers had been completed, and, as the L. V. R. R. Co. held this car in its possession on its tracks, and did not return the car to the P. M. R. R. Co., it deprived the P. M. R. R. Co. of exercising such care as was necessary for the safety of the car, therefore making the L. V. R. R. Co. responsible to the owners for all damage done, and the P. M. R. R. Co. holds that Arbitration Cases Nos. 432 and 702 bear it out in its claim for damage to this car.

After considerable correspondence, and failing to agree upon a settlement, it has been mutually agreed to place the case before the Arbitration Committee for a decision, and respectfully submits herewith the argument presented by each claimant for your careful consideration and decision.

STATEMENT OF THE LEHIGH VALLEY RAILROAD COMPANY.

Pere Marquette Railroad car 30366, loaded with flax by J. M. Steinhoff, of Wallaceburg, Ont., covered by Wallaceburg to Suspension Bridge Way-bill, Series L-7, February 1, 1906, consigned to Smith & Dover, Andover, Mass., via Lehigh Valley Railroad. This car was placed on L. V. R. R. tracks at 1 P.M., at Suspension Bridge, February 3, 1906, was inspected and condemned to cripple track for broken vertical draft timber bolts on B end at 10 P.M., February 3, 1906.

In accordance with the Niagara Frontier Interchange Inspection agreement, to which agreement the P. M. R. R. and L. V. R. R. Cos. are parties, instead of the car being set back to the P. M. R. R. on account of its crippled condition, the car was taken to our repair tracks at Suspension Bridge, where it was found that repairs could not be made, as the United States Customs Officers had placed tags on the seals of the car reading, "Hold for Customs," and as it is unlawful to open cars so tagged, it was, therefore, impossible to replace the draft bolts, making it necessary to transfer the lading. Transfer order No. 2158, dated February 4, 1906, was issued by the foreman to cover the transfer of the contents of this car. Car was plainly marked on the side with chalk "Transfer and return to P. M. R. R. for repairs."

The issuance of the transfer order and the marking of the car for transfer, as stated above, was in accordance with Article 3, of the Niagara Frontier Interchange Inspection Agreement. By becoming a party to this agreement, we claim that the P. M. R. R. Co. has waived its right to protection under the M. C. B. rules as regards any rule in the M. C. B. code that conflicts with the Niagara Frontier Interchange Inspection agreement.

The method of handling the transfer orders at Suspension Bridge is as follows:

A book record showing information for the transfer orders issued is kept in the office of car foreman at Suspension Bridge on the part of the L. V. R. R. The transfer order has two stubs attached to it. The required information is filled in on the transfer order and both stubs. The transfer order is forwarded to our agent at Suspension Bridge and the two stubs are forwarded to the Arbitrator at East Buffalo, who checks these stubs, retains one for his file and sends the other to the car foreman of the delivering road. On account of the L. V. R. R. having no facilities for doing transfer work at Suspension Bridge, the L. V. R. R. agent turns transfer orders over to the New York Central & Hudson River Railroad agent, who has the work done and bills direct on the road responsible for the transfer (in this case the P. M. R. R.), instead of making the bill for the cost of transferring against the L. V. R. R. In this particular case L. V. R. R. agent held both the transfer order and the P. M. R. R. way-bill on account of car being held up by order of the United States Customs Officers on account of the owner's declaration covering the contents of the car not having been received.

Several times our agent notified the P. M. R. R. agent that the car was being held and received a reply from the P. M. R. R. agent that the P. M. R. R. would release the car just as soon as they received the owner's declaration, which the United States Government Customs Officers required. The owner's declaration for the release of this car was not received by the United States Customs Officers until February 16, three days after the fire occurred.

At about 8 P.M., February 13, 1906, P. M. R. R. car 30366 was discovered to be on fire and the fire department was called out, chopped several holes in the roof and flooded the car with water and it was supposed that the fire had been extinguished. The fire was supposed to have been due to spontaneous combustion, as there had been no lights, so far as is known, in the vicinity of the car for several days previous to the fire. At about 1.30 P.M., on the 14th, the contents of the car were found to be again on fire and fire department again called out. This time car was opened and bales of flax and tow thrown out on the ground so as to make sure that fire had been extinguished. Car was loaded with 92 bales of flax and 42 bales of tow. Below is copy of telegram sent by L. V. R. R. agent to Superintendent, under date of February 14, 1906:

"Yours A.M. Car P. M. 30366 contained flax in bales, weight 26,250 lbs., received from P. M. February 3. It is a Canadian local shipment and has not been entered by U. S. Customs; therefore, full delivery to us has not yet been effected and no bill has been issued. Destination of flax is Andover, Mass., and P. M. R. R. is to enter goods at Customs. Shall we decline all responsibility under these circumstances, file 333."

Under date of February 14, the Superintendent replied to the agent as follows:

"Your wire date. Decline all responsibility for damage to P. M. 30366 and contents."

February 15, 1906, L. V. R. R. agent notified P. M. R. R. agent that the L. V. R. R. Co. declined all responsibility for damage to P. M. car 30366 and contents. The agent made no reply to this message, which would indicate that the P. M. R. R. did not think that the L. V. R. R. was responsible.

The agent of the L. V. R. R. was requested by the P. M. R. R. agent to have the bales which had been thrown out of the car returned to them, which the L. V. R. R. declined to do. The P. M. R. R. then requested the N. Y. C. & H. R. R. R. to have the bales loaded and this was done February 17, 1906. This material was loaded into L. V. cars 61644 and 72705 by N. Y. C. & H. R. R. R. employees.

On February 20, 1906, the Pere Marquette requested our agent to bond the car back to the P. M. R. R., as the P. M. R. R. agent was not under bonds for doing bonding work in connection with United States Government Customs for his road. As a matter of courtesy this request was complied with and cars were returned to the P. M. R. R.

Exception is taken to the statement made in the second paragraph of the case as submitted by the P. M. R. R., in which the statement is made that "no exceptions were taken to the car by the L. V. R. R. after the car was received by them." Exception was taken as indicated by issuance of transfer order No. 2158 on February 4, by the foreman. This order, in accordance with the rules of the Niagara Frontier Interchange Inspection agreement under which it was issued, was filed in the office of the L. V. R. R. agent at Suspension Bridge and the two stubs which were attached to it were forwarded to the arbitrator, who is arbitrator for the roads who are parties to the Niagara Frontier Interchange Inspection agreement. No doubt the arbitrator, in conformity to the rules, forwarded one of these stubs to the P. M. R. R. car foreman at Suspension Bridge, and this is the best kind of evidence that exception was taken to the car.

In support of this contention we also attach hereto copy of affidavit made by one of the inspectors who inspected and condemned this car for broken vertical draft bolts. The other inspector who assisted in the inspection of this car has since died.

Exception is taken to the third paragraph of the argument made by the P. M. R. R. Co., for the reason that in its present form it is unfair and misleading, in that they have not given the reason for the car being held from February 3 to 13, as the car was not held on account of its crippled condition, but was held on account of failure of the P. M. R. R. to furnish owner's declaration of entry for the United States Customs, and the car could not have been released on account of being held by United States Customs Officers, whether it had been in crippled condition or in perfect condition. Had the P. M. R. R. furnished owner's declaration at the time car was set into L. V. R. R. yards, as they should have done, the car could have been transferred not later than 4th or 5th, and it is probable that the shipment would have reached destination before the 13th, the date on which fire occurred, and P. M. car 30366 would have been returned to the P. M. R. R. for repairs immediately after transfer was made, in which case the fire would not have occurred at all.

In reply to contention raised in fourth paragraph of the P. M. R. R. Co.'s argument, would advise, as stated above, that L. V. R. R. agent, under date of February 15, notified the agent of the P. M. R. R. that the L. V. R. R. declined all responsibility for damage to P. M. car 30366 and contents. This information was given to P. M. R. R. agent not in reply to any request made by him, but was given by L. V. R. R. agent as information to the P. M. R. R. that the L. V. R. R. did not assume responsibility for this damage. The P. M. R. R. made no reply to this message, and we assumed by their silence that they gave their consent to the contention that the L. V. R. R. was not responsible.

In answer to the fifth paragraph of P. M. R. R. argument, we wish to state that it was not necessary for the L. V. R. R. to make an effort to return this car to the P. M. R. R. It is not the practice under the Niagara Frontier Interchange Inspection agreement for railroads that condemn cars on account of defects, with the exception of such defects as can not be accepted under the United States Safety Appliance Act, to return them for repairs to the delivering line, as the Niagara Frontier Interchange Inspection agreement was made for the express purpose of preventing delays to cars in transit by returning them to delivering line for repairs, and the P. M. R. R. being a party to this agreement should be well aware of this fact, and we claim that their contention in this regard should not be considered.

In reply to the sixth paragraph of the P. M. R. R. argument, desire to state that we hereby confirm the contention which we made in the L. V. R. R. statement article No. 4 bearing on this case, that is, that the responsibility for the " Hold for Customs " tags rests with the P M. R. R. agent, who failed to provide the owner's declaration required by Customs authorities after car was switched to the L. V. R. R. interchange track.

In reply to paragraph seven of the P. M. R. R. argument, the affidavit made by the inspector referred to above, indicates that vertical draft timber bolts were broken. We also attach copy of statement from the car foreman for the New York Central & Hudson River Railroad at Suspension Bridge, and who is a disinterested party, in which he states that he saw two new draft timber bolts which were newly applied in one draft timber in what was then the south end of the car when he inspected it after the fire. We think that this proves conclusively that the vertical draft timber bolts were broken.

In reply to paragraph eight of the P. M. R. R. argument, we contend that the authorization of the payment of reclaim for the per diem charges while this car laid in our yard is a complete acknowledgment by the P. M. R. R. of their responsibility for having the car in our yard.

In reply to paragraph nine of P. M. R. R. argument, we concede that the provision for taking back the contents of the car to have it reconditioned so as to make the loss as small as possible, is exactly as set forth in statement made by the P. M. R. R.

In reply to the tenth paragraph of the P. M. R. R. argument, we contend that the actual delivery of car was not made for the reason that the owner's declaration of entry for the United States Customs had not been received, which made it impossible for us to bill the car out from Suspension Bridge, and therefore, the P. M. R. R. had virtually not delivered the car to the L. V. R. R. In support of our contention we again refer to the fact that the P. M. R. R. authorized the payment of reclaim which we made on them for the per diem accruing during the time this car was held, which is evidence that they acknowledged their responsibility for having held the car.

The statement made in the last sentence and which reads as follows, "If for any reason the car was not accepted the P. M. R. R. should have been notified and the car turned back to them," has been answered by us in giving the original facts relative to the case. L. V. R. R. agent had several times notified the P. M. R. R. that car was being held and was notified that the P. M. R. R. would release the car just as soon as they could obtain owner's declaration, which the P. M. R. R. failed to obtain until February 16, 1906, three days after the fire and contents burned. The car was not set back to the P. M. R. R. for the reason that the Niagara Frontier Interchange Inspection agreement, to which the P. M. R. R. is a party, was formulated and adopted for the express purpose of avoiding delay and extra work incidental to switching cars back to delivering line, and the P. M. R. R. on account of being a party to this agreement is well aware of the fact that it was not the practice to return cars to the delivering line, excepting in special cases provided for in the rules, and as this particular case was not covered by one of these exceptions, there was no reason for returning the car to the P. M. R. R.

In conclusion we respectfully submit that this is not a case that can properly be handled by the M. C. B. Arbitration Committee, in view of the fact that the P. M. R. R. has forfeited its right to protection under the M. C. B. rules where they conflict with the rules of the Niagara Frontier Interchange Inspection agreement by becoming a party to this agreement, which, to a certain extent, makes void the M. C. B. rules of interchange in the Niagara Frontier territory.

Article 3 of the Niagara Frontier Interchange Inspection Agreement reads as follows:

"All cars will be received by either of the companies interested in this agreement and inspected in their yards, except any cars having defects contrary to the Federal Safety Appliance Act; such defects must be repaired by the delivering line before offered in interchange. The receiving company reserves the right to transfer any car that can not be repaired under load. They also reserve the right to reject high and wide cars, and cars the lading of which will not clear the measurements of the receiving line, or its connections, in order to pass same to destination, as per clearances published by the Official Clearance Guide."

You will note that this rule provides for the inspection of cars in yards of the receiving lines with the exception of safety appliances, and any defects that are contrary to the Federal Safety Appliance Act must be repaired by the delivering line before being offered in interchange. You will note that the road receiving the car also reserved the right to transfer any car that can not be repaired under load. Under this rule the L. V. R. R. had the right to have the car in question delivered into its yard and inspected there and had the right to order the car transferred when it could not be repaired under load. The L. V. R. R. elected to have this car transferred, as the work of removing the bales which it contained in order to apply draft bolts and replacing them would mean as much if not more than the actual transfer of the entire contents of the car.

This rule practically abrogates Rule 2 of the M. C. B. Code of Rules.

Article 10 of the Niagara Frontier Interchange Inspection Agreement provides for the appointment of an executive committee and defines the duties of that executive committee, which is to consider and pass upon any questions that may be referred to them from time to time by the Arbitrator or the roads interested. We contend that the case in question is one that properly should be referred to the Executive Committee of the Niagara Frontier Interchange Inspection Agreement for adjustment and have so stated to the Pere Marquette, both in writing and verbally, but the latter road has persistently refused to refer the case to this committee and for some reason seems to have entirely ignored it.

We submit a complete copy of the Interchange Inspection Agreement covering the Niagara Frontier for your consideration in connection with this case.

We respectfully submit, however, from the intimate knowledge that the Executive Committee of the Niagara Frontier Interchange Inspection

Agreement has of the agreement itself and the handling of the interchange of cars under this agreement in this territory, especially as regards both United States and Canadian Customs requirements, and the intimate knowledge this committee has of the territory itself, we contend that it is in a better position to pass on this case than the M. C. B. Arbitration Committee; and, in view of the fact, as stated above, that the P. M. R. R. by becoming a party to the Niagara Frontier Interchange Inspection Agreement has forfeited its rights to protection under the M. C. B. rules where they conflict with the Niagara Frontier Interchange Agreement, we contend that the case is not one to properly be decided by the M. C. B. Arbitration Committee but by the Executive Committee of the Niagara Frontier Interchange Inspection Agreement, and it is our belief that your Arbitration Committee will so decide.

In the event of the Arbitration Committee not agreeing with our contention that this is a case which does not properly come under its jurisdiction, we expect that the Arbitration Committee in deciding the case will give full consideration to the bearing which the Niagara Frontier Interchange Inspection Agreement has on the case.

DECISION.

The Arbitration Committee of the M. C. B. Association can not pretend to arbitrate cases brought to it under any modification of the M. C. B. rules or under other rules than the M. C. B. rules.

ARBITRATION CASE NO. 730.

CHICAGO, BURLINGTON & QUINCY RAILROAD COMPANY

versus

VICKSBURG, SHREVEPORT & PACIFIC RAILWAY COMPANY.

REQUEST FOR HOME ROUTE CARDS FOR TWO DRAFT SILLS WORN OUT, OLD DEFECTS.

The following is a synopsis of a controversy between the Vicksburg, Shreveport & Pacific Railway Company and the Chicago, Burlington & Quincy R. R. Co., in reference in furnishing home cards, requested by the V. S. & P. for C. B. & Q. car 42138, a 50-foot car which had two draft sills worn out, old defect.

On September 24, 1906, the Master Mechanic of the V. S. & P. requested home cards for the above car in a letter reading as follows:

"I beg to advise you that the above car is now in Monroe Yards with two draft sills worn out, old defect. Will you kindly furnish me home cards for same, and oblige?"

On October 2, 1906, the Superintendent Motive Power of the C. B. & Q. R. R. replied as follows:

"Referring to yours of September 24, requesting home cards for C. B. & Q. car 42138, which you advise is on your line at Monroe with two draft sills worn out, old defects. The routing of this car is via the Chic. Jct., L. S. & M. S., N. Y. C. & H. R., L. S. & M. S., C. C. C. & St. L. R. R. A. of St. L., M. K. & T., M. K. & T. of T., and V. S. & P. Rys. You will note from routing that car would have to go east before it would be finally returned to this company. As defects in question are only two draft sills I see no reason why your company could not apply same, and I would be pleased if you will kindly arrange to do so."

On October 8, the Master Mechanic of the V. S. & P. replied as follows:

"With reference to your letter of the 2d, wherein you requested me to make repairs to the above car, account of routing of the car being such a roundabout way and such a long haul, would say, that my reason for requesting home cards in the first place, was on account of car being 50 feet long and having no sills suitable, but as the M. C. B. rules permit it, I have instructed my foreman car repairs to apply spliced sills, which I will ask you to accept under these circumstances; and arrange for the per diem to cease until the car is repaired."

On November 3, 1906, the Master Mechanic of the V. S. & P. wrote the Superintendent Motive Power of the C. B. & Q. as follows:

"With reference to the attached copy of my letter of October 8, beg to advise you that I spliced the two draft sills for you and the car was turned out of the shops on October 19. Would therefore ask you to please see that we are not assessed with per diem between September 24 and October 19, and that my car repairs bill for this work is honored, notwithstanding the fact that both center sills were spliced at same end of the car, which is contrary to Rule 65, but was done for your accommodation."

It was thought, first, that the C. B. & Q. R. R. would appreciate the position in which the V. S. & P. Ry. was placed and be willing to pay for the repairs that had been made to its car and waive the per diem, which had unavoidably accrued, because the V. S. & P. Ry. was not responsible for the worn-out draft sills, which had undoubtedly gotten in that condition on account of the roads over which the car had passed not being willing to undertake repairs; second, as 50-foot sills are unusually long and not usually carried in stock, and M. C. B. Rule 65 does not allow two adjacent sills to be spliced at the same end of the car, and does not provide for reimbursement to the company making repairs if one of the sills had been removed and turned around so that its splice would be at the opposite end of the car, and furthermore the V. S. & P. Ry. does not consider that practical, as it is unlikely that holes would all have been bored exactly in the center of the sill, which would have necessarily been the case to permit of the sill fitting after being reversed, and that after an entirely new spliced sill had been applied that charges could only have been made for the spliced end of it, which would not have included compensation for the labor of removing the entire sill and framing the other one; furthermore the 1906 M. C. B. Rule 129 does not specifically define the kind of material which is not to be requested from the owners, but merely says, "except that which can be procured in the open market," and the V. S. & P. Ry. contends that 50-foot sills can not be procured in the open market, as that is an unusual length which is not carried in stock and would have to be ordered, cut, manufactured and delivered upon special requisition, requiring, probably, from thirty to sixty days to obtain, and that it would have been easier and quicker for the C. B. & Q. R. R. to have furnished the home cards requested and then made the repairs themselves, than for them to have sent this material to the V. S. & P. Ry. upon requisition; third, if the C. B. & Q. R. R. had complied with the request for home cards in the first instance, the V. S. & P. Ry. would have had no per diem or penalty to pay on this car after September 24, 1906. The V. S. & P. Ry. admits that if material had been requested from the car owner that per diem would have commenced again from the date of its receipt and continued while the repairs were being made, which would, in a manner, have applied in this case, from October 4, 1906, upon which date the C. B. & Q. R. R.'s letter of October 2 was received, but as Arbitration Case 162, no longer in force, clearly states that, "Home cards *must* be given if requested," the V. S. & P. Ry. would not have had any to pay if the home cards had been furnished. It also contends that in its reply of October 8 to the C. B. & Q.'s letter of October 2, the proposed nature of the contemplated repairs was fully explained, and as no reply was made by the Mechanical Department of the C. B. & Q. R. R. to that letter, or to the one dated November 3, that the absence of said replies is considered as an evidence of their acquiescence.

STATEMENT OF THE CHICAGO, BURLINGTON & QUINCY RAILROAD COMPANY.

The car in question was only about six years old, having been built in 1900, and could not have been in a *general worn-out condition;* furthermore, the only defects mentioned were two worn-out draft sills, which in no way could be considered as making car in a *general* worn-out condition.

That the splicing or renewing of two draft sills is a comparatively small job, and it is manifestly unfair to car owner to deprive him of the use of his car for a period of from twenty to sixty days while car is en route home for such repairs.

It is also unfair to owner to move car in this condition, as it would most likely receive additional damage that would probably cost more to repair than would the original defects for which car was moving home.

If the V. S. & P. Ry. had no suitable sills to apply to car and had been desirous of doing justice to owner they could have spliced one sill at one end, removed the other, reversed it and made splice at opposite end, thus complying with requirements of Rule 65.

Requests are constantly being made for home route cards for trivial defects, more particularly so since the per diem charges have been increased. Believing that Rule 125 refers only to cars that are in a *general* worn-out condition, the C. B. & Q. R. R. takes the position that the V. S. & P. Ry. was entirely wrong in requesting home route cards for this car. A decision from your Committee along these lines will do much to correct the abuses now being practiced under Decision No. 162, and will keep many cars in service that are now being sent home when repairs could easily be made by party having car in its possession.

DECISION.

The point at issue in this case is the obligation of an owner to issue home route cards upon demand, the V. S. & P. Ry. claiming that no per diem would have accrued between the dates named if home route cards had been granted, etc., seemingly taking the position under Decision No. 162, that home route cards *must* be furnished if requested. In the opinion of the Committee, decision in Case No. 720 will apply in the present dispute. Arbitration Case No. 162 has long since been abrogated by later rules and decisions, and as under ruling in Case No. 720, it has been decided that the owner has full option in the matter of furnishing home route cards, the position taken by the C. B. & Q. R. R. is correct.

ARBITRATION CASE NO. 731.

MISSISSIPPI RIVER & BONNE TERRE RAILWAY CO.

versus

CHICAGO & NORTH-WESTERN RAILWAY CO.

OPEN KNUCKLE APPLIED REPLACING OPEN KNUCKLE BROKEN.

STATEMENT OF THE MISSISSIPPI RIVER & BONNE TERRE RAILWAY.

This company rendered bill No. 14494 against the Chicago & North-Western Railway Company for repairs to freight cars during month of September, 1907. Bill included charge of $1.30 for new open knuckle applied to their car 86264, September 20, on account of old open knuckle broken.

The C. & N.-W. Ry. Co. declining payment for same, the M. R. & B. T. Ry. claims charge should be accepted for the following reasons:

First. That there is nothing in the M. C. B. rules proper, in force September 1, 1907, to the effect that open knuckles should not be used in making repairs, and while the price for an open knuckle is not given, Rule 77 states, in the case of knuckles used, the repair card stub must state whether open or closed knuckles are removed and applied, which would indicate that open knuckles were used as formerly.

Second. Knuckle was applied ten days prior to date of pamphlet issued by the Association and one month or more prior to receipt of same in this office.

Third. That in the absence of the information contained in said pamphlet, this company was justified in repairing broken open knuckle with new one of same pattern.

Fourth. This company does not believe that the instructions contained in said pamphlet, dated October 1, 1907, were intended to be effective thiry days prior to its issue.

Fifth. A new open knuckle having been used to replace a broken open knuckle, the equipment of the C. & N.-W. Ry. Co. suffered no damage whatever, and, inasmuch as they had the use of same until broken or worn out, they should accept the charge.

The M. R. & B. T. Ry. having accepted charges for open knuckles applied to their cars up to date of pamphlet covering the matter, October 1, believes it has accepted the pamphlet in the spirit in which it was issued, refusing to take advantage of any technicality, and submits its case on the principle involved.

STATEMENT OF THE CHICAGO & NORTH-WESTERN RAILWAY.

The Mississippi River & Bonne Terre Railway rendered their bill No. 14494 against this company for repairs to cars during the month of September, and same was received by our Auditor R. R. Accounts on October 21, 1907.

Bill includes a charge of $1.30 for open Chicago knuckle to replace one of similar pattern removed as shown by the bill and repair card stub dated September 20, 1907, as applied to car 86264.

First. The C. & N.-W. Ry. declines payment, contending that the M. C. B. Association recognizes the solid pattern exclusively as a standard.

Second. As a result of the M. C. B. Association destandardizing the open knuckle, no price was quoted for same in rules governing the interchange of cars in effect September 1, 1907.

Third. It then becomes a question what charge and credits should be allowed for such knuckle, and the Arbitration Committee holds as per their pamphlet dated October 1, that the knuckle be credited as scrap.

The M. R. & B. T. Ry. insist on our paying their bill as rendered and agree to submit the case to the Arbitration Committee for their decision.

DECISION.

The M. C. B. Association by letter ballot, Proceedings of 1903, adopted the solid knuckle as the standard of the Association to be used "for all repairs as well as on all new couplers after January 1, 1904." The pamphlet issued by Arbitration Committee dated October 1, 1907, did not in any way change the action of the Association as above outlined, but was simply issued to the members of the Association to call their attention to items which seemed to have been overlooked. Under the rules, therefore, the Mississippi River & Bonne Terre Railway made wrong repairs when applying an open knuckle. They should cancel their charge and forward defect card for wrong repairs. The C. & N.-W. Ry. should credit them with the scrap value of one open knuckle when proper repairs are made.

NOTE.—*Mr. Schroyer being interested in this case was not a party to the decision.*

Arbitration Case No. 732.

Chicago, Milwaukee & St. Paul Railway Company

versus

Delaware, Lackawanna & Western Railroad Company.

TWO DRAFT TIMBERS AND DEADWOOD RENEWED, PROPER CHARGE FOR.

Synopsis of controversy between the Chicago, Milwaukee & St. Paul Railway Company and the Delaware, Lackawanna & Western Railroad Company, with reference to labor charged by the D. L. & W. R. R. Co. for repairing C. M. & St. P. box car 21704, January 8, 1907. Car repaired as follows:

2 draft timbers 5 by 7 inches by 8 feet 6 inches	" B " end
10 draft timber bolts 1 by 18 inches	"
12 lug bolts ⅞ by 8 inches	"
4 carrier iron bolts ⅞ by 18 inches	"
1 deadwood 4½ by 8 inches by 2 feet	"
1 draft spring 6 by 8 inches (for pocket)	" A " end

In billing upon the C. M. & St. P. Ry. Co. for these repairs, the D. L. & W. R. R. Co. has charged a total of 17 hours' labor, made up as follows:

2 draft timbers, 10 draft timber bolts, 12 lug bolts, 4 carrier iron bolts, all " B " end of car	10 hours
1 deadwood, same end of car	3 hours
Draft spring for pocket attachment at opposite end of car	4 hours
Total	17 hours

Statement of Chicago, Milwaukee & St. Paul Railway Company.

The C. M. & St. P. Ry. Co. contends that the total labor should not exceed sixteen hours, as three hours were not expended in this case for renewal of deadwood, by reason of the fact that the nuts of carrier iron bolts had to be taken off and replaced in order to renew the two draft timbers, and that this operation was not gone through with again in renewing the deadwood; in other words the C. M. & St. P. Ry. Co. maintains that the draft timber labor of ten hours includes one hour for removal and replacement of the nuts to carrier iron bolts; also that the three hours for removal of deadwood is made up on the basis of one hour for removal and replacement of the carrier iron bolt nuts; but the C. M. & St. P. Ry. Co. believes it unreasonable and contrary to the spirit of the M. C. B. rules, to charge this one hour for removal and replacement of the nuts of carrier iron bolts in renewal of the two draft timbers, and another hour for this identical item, when in reality the labor was performed but once. We believe this is doubling up labor charges simply because the M. C. B. rules provide no combination labor charges for renewal of draft timbers and deadwood same end of car at same time. The C. M. & St. P. Ry. Co. obtains its information as to fixed labor charge of one hour for removal and replacement of carrier iron bolt nuts from the ruling in last paragraph of Arbitration Committee's Decision No. 693, which fixes such labor at one hour. This decision (No. 693), as well as Decisions 670 and 666, show that it is contrary to the spirit of the M. C. B. rules to charge labor when it is not actually performed, and we believe it is very clear that one hour has been charged by the D. L. & W. R. R. Co. in this case which was not actually performed.

While the amount involved here is trifling, it is the principle of preventing the building up of cumulative labor charges which the C. M. & St. P. Ry. Co. is striving to maintain, hence the necessity of submitting the case to arbitration in order to protect its interests in this respect.

STATEMENT OF DELAWARE, LACKAWANNA & WESTERN RAILROAD COMPANY.

January 8, 1907, this company repaired C. M. & St. P. Ry. car 21704, and among other labor charges for repairs made were the following:

Two draft timbers renewed	10 hours,
One deadwood renewed	3 hours.

The Chicago, Milwaukee & St. Paul Railway Company made claim that labor charge for renewal of deadwood was excessive, and stated that in its opinion charge should not exceed two hours, quoting Arbitration Decision 693 as their authority.

The Delaware, Lackawanna & Western Railroad Company claims that the rules give a specific charge for work done and that charge made by them was not excessive and that a case, identical in every particular (630), has already been referred to the Arbitration Committee, and its decision was that charge made on the basis of rules is correct.

An inspection made of a large number of cars, property of numerous railroads throughout the country, shows that in no case does the labor of renewing draft timbers reduce to any appreciable extent the labor incident to renewal of deadwood. It is quite true that to replace draft timbers, it is necessary to drop the carrier iron, but the labor of slacking off the nuts on carrier iron bolts is so insignificant in comparison to the entire labor incident to renewal of deadwood that it should be given no consideration. The carrier iron bolts do not require removal to permit draft timbers to be replaced, only the carrier iron bolt nuts removed and draft timbers driven down.

To renew a deadwood in connection with renewal of draft timbers, or as an individual operation, it is necessary to remove and replace carrier iron bolts, usually four in number, cross bolts, from four to eight, the uncoupling lever, and the striking plate, and as none of this is necessary when draft timbers alone are renewed, Rule 106, which makes a specific charge of ten hours for renewal of two draft timbers and three hours for renewal of deadwood, should govern.

To sum the case up in a few words, Rule 106 and Arbitration Decision 630 justify the charge made, and Arbitration Decision 693, relating as it does to a case dissimilar in every way, has no bearing whatever to case in question.

The case is respectfully referred to Arbitration Committee for their decision.

DECISION.

This case is identical with Case 630, previously acted on, and with Case 727 in present series. While it is, of course, the spirit of the rules to avoid duplication of charges as far as possible, some overlapping of charges is inevitable, as it has never been thought necessary to absolutely define separate charges for each detail operation.

The case is not at all similar to Case 693 quoted, as in the latter case, the overlapping labor performed was a much greater proportion of the total labor than in the case under discussion. In the opinion of the Committee, while some overlapping of labor charge occurs, it is such a small proportion of the total that it should be disregarded, as decided in Cases 630 and 728. The charge of the D. L. & W. R. R. is correct and should be paid.

ARBITRATION CASE NO. 733.

THE WABASH RAILROAD COMPANY

versus

CENTRAL OF GEORGIA RAILWAY COMPANY.

RESPONSIBILITY FOR WRONG REPAIRS CARDED, JOINT EVIDENCE NECESSARY.

STATEMENT OF THE WABASH RAILROAD COMPANY.

On October 4, 1906, the Wabash R. R. made repairs to Central of Georgia Railway car 2108, repair card stub reading as follows:

2 draft timbers 5 by 9 inches by 5 feet, account decayed and broken.
8 draft timber bolts ⅞ by 20 inches, account broken.
Repairs at "A" end. Loaded car.

On December 26, 1906, the Wabash again made repairs to same car, repair card stub reading as follows:

1 pair draft timbers 5 by 8½ inches by 5 feet, account broken.
8 draft timber bolts, ⅞ by 20 inches, account broken.
4 tie bolts, ⅞ by 20 inches, account broken.
4 carry iron bolts, ⅞ by 18 inches, account broken.
2 lag screws, ½ by 3½ inches, account broken.
Repairs at " B " end.

Charges for this car were made in Wabash bill No. 49441, amount $49.47, versus C. of Ga. Ry., as follows:

10- 4	33 lbs. wrought,	44 ft. lumber,	12 hrs. labor		
12-26	65 lbs. wrought,	42 ft. lumber,	12 hrs. labor,	2 lags	
	—	—	—	—	
	98 lbs. wrought,	86 ft. lumber,	24 hrs. labor,	2 lags	
	.02¼	.03¼	.20	.02	
	——	——	——	—	
	$2.20	$2.80	$4.80	.04	Total $9.84

The C. of G. Ry. refused to pay bill No. 49441 until charges for this car were eliminated. It, therefore, became necessary to reduce original bill and make a new bill covering repairs to this one car.

After presenting this new bill for payment it was returned, and after more correspondence it was agreed to submit same to Arbitration Committee.

STATEMENT OF WABASH R. R.

1. We claim repairs were correct. C. of G. Ry. claims they are not correct. Wabash claims joint evidence absolutely necessary to settle a controversy of this kind.

2. We are entitled to charge owners for any repairs for which they are responsible, and owners can not insist upon charges being eliminated from bill, but must furnish proof by joint evidence that the repairs were wrong and demand defect card. We believe this is the intent of Rules 85 and 86, otherwise the C. of G. Ry. could have draft timbers always renewed while on foreign roads without cost to them.

3. From the fact that the car carried different size draft timbers on both ends is very strong proof that owners do not maintain standard draft timbers and thereby receive the benefits of foreign repairs without cost.

STATEMENT OF CENTRAL OF GEORGIA RAILWAY.

We claim the standard draft timbers on car 2108 are 5½ by 9 inches by 5 feet, and in replacing same the Wabash Railroad used wrong sizes, as shown above. We requested defect card for our protection, or cancellation of charges, on the ground of wrong repairs, believing that owners should demand the maintenance of standard sizes of material when renewals are made by foreign lines, in accordance with M. C. B. Rule 58, and believe the Wabash R. R. is responsible as per Rule 46. It is our understanding that joint evidence is final, but do not consider it an essential means of correcting repairs which owners know are wrong, particularly in view of the fact that car may be hundreds of miles away from its lines, as was the case involved herewith, and to trace car home in every instance in order to secure this would impose a hardship and cause delays.

We believe had the Wabash R. R. billed for a wrong size journal bearing, and were called upon for defect card, that same would be furnished without awaiting the arrival of joint evidence.

Owing to the large number of objections filed between railroads on the point of wrong repairs, a decision from the Arbitration Committee as to what they consider necessary proof will, we believe, be widely appreciated.

DECISION.

Whether repairs were correctly made or not, the Wabash R. R. Co. is entitled under the rules to compensation for work performed. The rules provide that the evidence of a joint inspector, or of one interested party and one disinterested in case of wrong repairs, shall be final. The maker of repairs is entitled to protection as well as the car owner. We must assume the Wabash R. R. Co. applied proper repair cards, when repairs for which they billed were made.

The Central of Georgia Ry., when car is received home through above repair cards and proper joint evidence, may properly ask for defect card to cover repairs if wrong. Only billing for same, however, after car is reconstructed to original standard.

ARBITRATION CASE NO. 734.

THE OREGON RAILROAD & NAVIGATION COMPANY

versus

THE CHESAPEAKE & OHIO RAILWAY COMPANY.

RESPONSIBILITY FOR BROKEN CENTER PLATE NOT M. C. B. STANDARD.

STATEMENT OF OREGON RAILROAD & NAVIGATION COMPANY.

On January 15, 1907, the Oregon Railroad & Navigation Company ordered by wire from the Chesapeake & Ohio Railway Company one bottom center plate, A-921, for repairs to C. & O. car 7230. On January 24, 1907, the C. & O. refused to furnish the center plate and referred the O. R. & N. Co. to the Simplex Railway Appliance Company, Hammond, Ind. The O. R. & N. Co. did not feel it was its duty to allow the accumulation of per diem charges on this car while it was casting about the country in further endeavor to obtain the center plate, but did feel that the C. & O. Ry. people should know to a certainty where to obtain the proper plate in case the very unusual condition prevailed of their not having such a commonly used repair part standard to their equipment in stock, and, on February 5, again requested that the center plate be furnished.

On February 16, the C. & O. Ry. again refused to furnish the center plate (although, in a letter dated May 13, it is acknowledged that the C. & O. Ry. have several hundred cars equipped with this style of plate) and referred the O. R. & N. Co. to M. C. B. Rule 129; to which the O. R. & N. Co. replied that they were perfectly familiar with this rule and considered that they had fully complied with same.

It so happened that a foreign car was wrecked on the O. R. & N. Co. lines the latter part of March, which had a center plate exactly like the one the O. R. & N. Co. was waiting on the C. & O. Ry. people to furnish, and the O. R. & N. Co. immediately repaired the C. & O. Ry. car and turned it out for service on March 29, notifying its Equipment Service Bureau that per diem should again be credited from that date.

The O. R. & N. Co. contends that the term "open market," as expressed in Rule 129, does not obligate it to seek from the manufacturers a single center plate to replace one of a contour and general design peculiar to a certain class of equipment of any foreign company; that this material is special material, not in the open market; neither is it M. C. B. standard; that it has a perfect right to feel that the car owners are the proper parties to call upon for such a repair part, and that it fulfilled its obligation to the rules and to the C. & O. when it made the request for same.

The question is, whether per diem charges are due the C. &. O. Ry. or not, covering the period car 7230 was waiting for the center plate, and correspondence failing to settle the matter, it is mutually agreed to refer the case to the Arbitration Committee for decision.

STATEMENT OF CHESAPEAKE & OHIO RAILWAY COMPANY.

On January 15, 1907, the Purchasing Agent of the Oregon Railroad & Navigation Company ordered by wire, confirming same by Order 62494, one bottom center plate A-921, for repairs to C. & O. Ry. car 7230, to be shipped to the O. R. & N. Co., care of Supply Department, Le Grande, Ore.

After a canvass of the Chesapeake & Ohio System, it was found that the material was not in stock, and on January 24 the C. & O. Ry, returned the order, advising that it could not supply the material, and further advising that it could be purchased of the Simplex Railway Appliance Co., Hammond, Ind.

The order was returned to the C. & O. Ry. February 5 by the O. R. & N. Co., advising that it could not furnish the material from stock, nor manufacture it in their shops, and that under the rules it should be furnished by the C. & O. Ry. regardless of the fact that it could be bought in the open market.

The C. & O. Ry. again returned the order on February 16, calling attention to M. C. B. Rule 129, that railroads were not required to furnish material which can be purchased in the open market, and again referred the O. R. & N. Co. to the Simplex Railway Appliance Co, of Hammond, Ind., for the material.

On April 30, the O. R. & N. Co. advised that on March 29 it had secured the material from a foreign car, which had been destroyed on its line, and C. & O. Ry. car 7230 was turned out for service on that date; otherwise, the car would still be waiting receipt of material from owners; stating that due consideration had been given M. C. B. Rule 129, and it was their opinion that car owners should furnish material for repairs to their cars, whether special or otherwise.

The C. & O. Ry. believes that Rule 129 means what it says, that "Companies shall promptly furnish each other, upon requisition, and forward free over their own road, material for repairs to their cars, *that can not be procured in the open market.*"

Correspondence failing to settle the matter, it is mutually agreed to refer the case to the Arbitration Committee for decision.

DECISION.

Rule 129, of the 1906 Code of Rules, says, "Companies shall furnish promptly to each other and forward free over their own line, material for the repairs to their cars injured on a foreign line, that can not be procured in the open market." We find there are a great many different sizes and shapes of center plates on the various roads in the country and there is nothing in the papers to show that this was M. C. B. standard material. If a center plate had been procured in the open market, it might not have been standard to the car and the O. R. R. & N. Co., would have had to pay for wrong repairs when the car arrived home. It was the intention of the framers of the rules that M. C. B. standard material should be furnished by the company damaging the car, but material not M. C. B. standard should be furnished by the owners, and in 1907 the rules were changed to fit such cases.

It is the opinion of the Committee that the Chesapeake & Ohio Ry. should have furnished the center plate.

ARBITRATION CASE NO. 735.

SOUTHERN RAILWAY COMPANY

versus

PITTSBURGH & LAKE ERIE RAILROAD COMPANY.

RESPONSIBILITY FOR DUPLICATE AIR HOSE APPLIED

STATEMENT OF THE SOUTHERN RAILWAY COMPANY.

The Southern Railway Company on July 26, 1907, applied one air hose to "B" end of Pittsburgh & Lake Erie R. R. car 388; the car still being on the Southern Ry. Co.'s line, they applied another hose to the same end of the car on August 24, 1907. The Southern Ry. reports that the air hose removed from the car, originally applied by them on July 26, was not damaged by unfair usage or carelessness on the part of the employees, but evidently on account of defective hose, and refuses to issue defect card asked for by the owners of the car, stating that all air hose are purchased according to the M. C. B. specifications and that the hose was applied in good faith; that it was unaware of any existing defects and that the air hose stood the test as required; furthermore, that it would be impossible to keep trace of all the air hose removed and applied to and from each car on the line, for the purpose of demanding a new hose from the manufacturers on the ground that the hose became defective after being in service a month or more; furthermore, the Southern Ry. did not claim that the hose was defective at the time it was applied, but evidently became so while in service. Under these circumstances, it should not be compelled to stand the cost of repairs to the car.

STATEMENT OF THE PITTSBURGH & LAKE ERIE RAILROAD COMPANY.

The Pittsburgh & Lake Erie Railroad Company takes the position that in view of the fact that the Southern Ry. Co. admits that the hose was evidently defective, that offset card should be granted, as the Southern Ry. Co. could have replacement made by the manufacturer on account of its being defective when furnished, it being the custom of most of the hose manufacturers to replace without charge any defective hose of their manufacture, and takes the position further that unless the company applying the hose gives the owner of the car such protection, it works a hardship upon them.

By mutual consent the matter is referred to the Arbitration Committee for decision.

DECISION.

Air hose failing under fair usage is an owner's defect (see Decision 655). No evidence is presented to indicate that the Southern Ry. Co. applied inferior hose; but, in fact, that the hose it used and applied to this car was in accordance with M. C. B. specifications. All hose can not be tested before application. In the opinion of the Committee the charge of Southern Ry. Co. is correct and should be paid.

ARBITRATION CASE NO. 736.

PITTSBURGH & LAKE ERIE RAILROAD COMPANY

versus

MONTOUR RAILROAD COMPANY.

5 BY 5-INCH SHANK COUPLERS APPLIED IN PLACE OF 5 BY 7-INCH COUPLERS STANDARD TO CAR.

The Montour Railroad connects with the Pittsburgh & Lake Erie Railroad at Montour Junction, Pa. It had delivered to it during December, 1907, and January, 1908, a number of cars belonging to the Montour R. R. with couplers having 5 by 5-inch shank in place of 5 by 7-inch shank, the latter being proper for the cars and cars so stenciled. Some of these cars had couplers with 6½-inch butt ends in place of 9⅛ inches, standard to cars. The Montour R. R. demanded of the delivering road, namely, the P. & L. E. R. R., defect cards on account of improper repairs. These cards were refused for the reason that the improper repairs were not made by the P. & L. E. R. R. However, the P. & L. E. R. R. joins with the Moutour R. R. in signing improper repair cards, and for the purpose of getting a decision this case is mutually submitted to the Arbitration Committee.

STATEMENT OF THE MONTOUR RAILROAD.

The P. & L. E. R. R. delivered to the Montour R. R. on various dates the following cars:

12-19 M. R. R. 7372, 1 coupler with 5 by 5-inch in place of 5 by 7-inch shank
12-20 M. R. R. 7505, 1 coupler with 5 by 5-inch in place of 5 by 7-inch shank
12-20 M. R. R. 7218, 1 coupler with 5 by 5-inch in place of 5 by 7-inch shank
12-26 M. R. R. 7627, 1 coupler with 5 by 5-inch in place of 5 by 7-inch shank
1-11-08 M. R. R. 7305, 1 coupler with 5 by 5-inch in place of 5 by 7-inch shank.

Some of the above cars had couplers with 6½-inch butt ends in place of 9⅛ inch, standard to the cars. The Montour R. R. demanded M. C. B. defect cards on account of wrong repairs, which the P. & L. E. R. R. declined, but furnished joint evidence cards. The Montour R. R. contends that there is a principle involved in Rule 44, as is the case in Rules 31, 42, 43 and 45. The principle involved is not to simply protect the car owner against a few items of wrong repairs, while in the main the owner has no relief except through reciprocity. The framers of the M. C. B. Rules have held in mind the all-important question of safety, hence the framers of the rules have provided that certain defects which ordinarily are chargeable to the owner are, as a force measure, made a delivering company's responsibility when offered in interchange.

In Rule 44 it is recognized that the tail pin coupler rear end connection is unsafe under present day train tonnage, and when substituted for a coupler pocket that same is not considered good practice, and the delivering road is made responsible.

We contend that a coupler with 6½-inch butt with liners added to accommodate a 9⅛-inch coupler pocket with rivets passing through the liners is decidedly bad practice and unsafe.

The M. C. B. Association has adopted two standard couplers, namely, 5 by 5-inch and 5 by 7-inch shank, with two dimensions of butt ends, 6½ inch and 9⅛ inch.

We contend that a car equipped with a 5 by 7-inch coupler *and so stenciled* should come under Rules 44, 58 and 59. Rule 47 provides that an M. C. B. defect card shall be applied when repairs are made to foreign cars. In the case of the cars in question, the company making the wrong repairs failed to comply with Rules 47 and 76. The roads having had these cars in their possession were asked as to whether wrong repairs were made by them *and all* replied that they had no record of any change of couplers while in their possession.

Since practically all metal cars or cars with steel under-frames are equipped with 5 by 7-inch shank couplers and 9⅛-inch butt end and the car *so stenciled,* and said dimensions of coupler having been made standard by the Association, we deem it a matter of *safety* as well as equity that the delivering company should be made responsible for such wrong repairs when offered in interchange. The P. & L. E. R. R. declined to be responsible for such wrong repairs not made by them, based on the general interpretation of the rule, to all of which the Montour R. R. makes full acknowledgment.

The importance of the case is of such magnitude that it has prompted both parties to make a friendly test of the case by submitting same to the Arbitration Committee for decision.

STATEMENT OF THE PITTSBURGH & LAKE ERIE RAILROAD.

We believe that, in accordance with the established rules, we are not responsible for the improper repairs, due to the fact that they were not made by this company, and will recite Rule 4, the last portion of which clearly defines that the delivering road is not responsible for improper repairs not made by it, with the exception of cases provided for in Rules 31, 42, 43 and 44. None of the latter named rules bears upon the question of coupler shanks. We will also quote Rule 46, the intent of which is very clear that the road making improper repairs is solely responsible to the car owner. We will direct attention also to Rule 70, which bears further upon the subject that the company making the improper repairs is liable to owner. We will also quote Rules 83 and 84. Neither one of these rules nor the ones previously quoted place the responsibility of such improper repairs upon the delivering company.

We will call particular attention to Rules 85 and 86. Being the delivering company in this case, when the Montour R. R. called attention to the improper repairs, our inspector at the junction point signed jointly with the Montour R. R. inspector, joint evidence card for couplers having 5 by 5-inch shank instead of 5 by 7-inch. It is understood, as recited in the case, that we had investigated and found that the improper repairs were not made by us.

We believe our responsibility ends here to be in strict compliance with the rules, or at least our interpretation of them.

DECISION.

The Pittsburgh & Lake Erie Railroad did not make repairs. Under the rules parties making wrong repairs are directly responsible to the owner. The principle involved is the principle on which the effectiveness of the organization depends—that is, common honesty between railroads.

ARBITRATION CASE NO. 737.

SAN PEDRO, LOS ANGELES & SALT LAKE RAILROAD COMPANY

versus

HOUSTON & TEXAS CENTRAL RAILROAD COMPANY.

CORRECTION OF REPAIR BILLS UNDER RULE 98.

On March 12, 1907, the San Pedro, Los Angeles & Salt Lake Railroad Company rendered a bill against the Houston & Texas Central Railroad, including among others a charge of four hours' labor for applying one coupler to car 2160.

On July 9 the H. & T. C. returned bill to the makers, stating that the car in question was equipped with a stem coupler instead of pocket coupler, and therefore the labor charge was excessive by two hours.

The S. P. L. A. & S. L. R. R. Co. accepted the statement made by the H. & T. C. R. R., and accordingly issued authority to counterbill for 40 cents, being the amount overcharged, and also called the attention of the H. & T. C. R. R. to the fact that inasmuch as the amount involved was less than $1, the bill should not have been returned, but passed for voucher, and the apparent error called to the attention of the S. P. L. A. & S. L. R. R. Co.

To this the H. & T. C. R. R. replied, stating that it was against the policy of that company to voucher any bill containing acknowledged errors, regardless of the M. C. B. Rules, and requested that correction be shown on face of bill.

The S. P. L. A. & S. L. R. R. Co. declines to do this, and believes that inasmuch as the H. & T. C. R. R. Co. is a member of the M. C. B. Association, it is compelled, according to Rule 132, to abide by such rules as a whole, and can make no exceptions. It requests that bill be passed for voucher, but if the H. & T. C. R. R. did not agree to this, that the matter be submitted to the Arbitration Committee.

The H. & T. C. R. R. again declines to accept the authority given, and offers as its reasons the recent action of the Association of Railway Accounting Officers, in which it was decided to disregard M. C. B. Rule 98, and return all bills for correction where there was any error known to exist, and as the S. P. L. A. & S. L. R. R. Co. is a member of the Association of Railway Accounting Officers, it was not necessary to refer the matter to the Arbitration Committee of the M. C. B. Association.

To this the S. P. L. A. & S. L. R. R. Co. replied that it can not consistently make any correction in this bill, and is not required to according to the Rules; that it has always considered Rule 98 a good one, as it saves considerable clerical work in correcting bills, and also avoids delays in settlement of such bills. It further believes that in view of the action taken by the American Railway Accounting Officers, that the M. C. B. Association should have an opportunity to give their views on the subject, and again ask that unless the bill can be accepted in its present shape, together with the authority given, that the matter be referred to the Arbitration Committee.

DECISION.

The Houston & Texas Central Railroad Co. refuses the payment of bill under Rule 98 due to the position taken by its Auditor, that he is not authorized to approve incorrect bills, and further that the question is an accounting one and not one to be properly decided by the Arbitration Committee of the Master Car Builders' Association.

Rule 98 was originally incorporated in the M. C. B. Rules at the request of the Association of American Railway Accounting Officers, nor does it conflict with the requirements of the Interstate Commerce Commission. Its provisions are not at variance with the practice of that Association, therefore the Arbitration Committee of the Master Car Builders' Association feels that it is one on which it can properly rule.

Under the requirements of Rule 98 bills should not be returned for correction when the error does not exceed $1. The Houston & Texas Central Railroad Co. should pay the bill under the provisions of this rule.

ARBITRATION CASE NO. 738.

LOUISIANA & ARKANSAS RAILWAY COMPANY

versus

ST. LOUIS, IRON MOUNTAIN & SOUTHERN RAILWAY COMPANY.

SILLS BROKEN AND DECAYED, DISAGREEMENT AS TO FACTS IN THE CASE.

STATEMENT OF LOUISIANA & ARKANSAS RAILWAY.

On April 10, 1907, the St. Louis, Iron Mountain & Southern Railway Company offered the Louisiana & Arkansas Railway Company in interchange at Hope, Arkansas, Southern Ry. flat car No. 51784 (empty). Our car inspector refused this car account of the following defects: 1 end sill, broken and decayed; 2 side sills, broken; 2 intermediate sills, broken; 1 center sill, broken.

One of the side sills, two intermediate sills and one of the center sills were broken at the needle beam (A end); the other side sill was broken at the transom (A end); the end sill is in a badly decayed condition (B end); being broken and partly missing at one end.

After this car was ordered back to the St. L. I. M. & S. Ry., their car inspector did not deny the fact that the above mentioned defects existed, and billed the car to their shops at Baring Cross, Arkansas, for necessary repairs.

On April 14, 1907, the St. L. I. M. & S. Ry. depot agent at Hope, Arkansas, called up over the telephone our depot agent at that point and explained to him that the St. L. I. M. & S. Ry. yards were blockaded with loads and empties and account of scarcity of room it was necessary to use their receiving track to store their cars until such time that the blockade could be relieved, and if it would be agreeable to the L. & A. Ry. they would place all the loaded and empty cars coming to our road in the L. & A. yards and we could switch out the O. K. cars and place the Bad Order cars back in the St. L. I. M. & S. yards. Among the cars which were placed in the L. & A. yards by the St. L. I. M. & S. Ry. was Southern flat car No. 51784, which our car inspector had ordered back to the St. L. I. M. & S. Ry. on April 10, 1907. While one of our train crews was switching this car out to be placed back in the St. L. I. M. & S. yards, the car was broken in two at the needle beam. All sills showed old breaks, with the exception of one intermediate sill; one center and one intermediate sill showed old breaks half way through sills; these breaks were not discovered by our car inspector at the time he made his inspection of car on April 10, 1907. The balance of the sills were broken as hereinbefore described. The car received no rough handling whatever while being switched by our train crew. The couplers, buffer blocks, end sills, draft timbers and bolts are intact, which plainly indicates that car did not receive sufficient rough handling to break it in two had it been in good condition. As soon as we could consistently do so, we picked car up and placed it back in the St. L. I. M. & S. yards and notified them of the accident. The St. L. I. M. & S. Ry. claims that there were two intermediate and one side sill broken when car was first placed on transfer tracks, and these breaks could have been spliced at A end. We offered to settle with them for breaking two intermediate and one center sill, but they would not accept this offer and insisted on us settling with owners of car for the value of same.

We contend that the St. L. I. M. & S. Ry. should not have placed this car in our yards after our having marked car bad order some five days previous, and that they did this on their own responsibility, as the car was still in their possession, it having never been accepted by our road; that they should settle with owners of car for value of same and accept M. C. B. defect card from us for two intermediate and one center sills.

For information we are sending herewith the original bad order tag covering the defects noted by our car inspector at the time he inspected Southern car No. 51784, April 10, 1907. This bad order tag was applied to car when he had made his inspection of same. We also attach a copy of the inspector's report of his inspection of this car, etc.

STATEMENT OF ST. LOUIS, IRON MOUNTAIN & SOUTHERN RAILWAY.

The above mentioned car, Southern No. 51784, was delivered by the St. L. I. M. & S. Ry. Co. to the L. & A. Ry. Co., at its connection, located at Hope, Arkansas, April 10, 1907, at which time the car was jointly inspected by inspector for the St. L. I. M. & S. Ry. and the inspector for the L. & A. Ry. It was discovered at this time that the car had one side sill, one intermediate sill and one draft sill cracked, also one end sill broken at B end, for which the inspector of the St. L. I. M. & S. Ry. issued defect card.

The L. & A. Ry. accepted the car in this condition, and while this car, together with about forty others, was being handled in their yards by their own engine and engine crew, it was broken in two.

The enclosed blue-print will indicate to you, in black check marks, the location of the breaks in the one side sill, one intermediate sill, one draft sill, and the end sill at B end, and it is furthermore shown on same blue-print, in red check marks, the location of the breaks in the two side sills, four intermediate sills and two draft sills, demonstrating clearly, as you will observe, that the entire car was broken in two at a different point from the damages inflicted, supposedly while the car was in our possession, and for which we issued defect card and assumed liability. Their inspector knew the condition of this car at the time it was tendered to him for service, and if it was not his intention to accept the car for loading on his line, it should have been handled carefully and sent back to our line at Hope, Ark.

We take the position that inasmuch as this was an eight-sill car and only three sills were broken, it was, at the time the car was delivered to the L. & A. Ry., able to withstand ordinary freight train handling and usage, therefore we maintain that the L. & A. people, while handling the car in switching service in their own yards, caused the damage as indicated on the print, by impact or extremely rough handling.

The L. & A. Ry. decline to assume the responsibility for the destruction of the car and failure to settle the question, we respectfully ask that your Committee investigate the matter through the evidence submitted, and decide which line is responsible for the destruction of the car in question.

DECISION.

Rule 133 provides that in case of dispute, subscribers to the Rules will submit through the Secretary, jointly, an abstract setting forth the points at issue, such abstract to be signed by both parties to the dispute. The opinion of the Committee must of necessity be based on the evidence presented, and both parties to the dispute must agree as to the facts in the case before the Committee can act.

In the case under discussion there is a wide variation in the statements of facts, and until the parties interested can agree as to the details of the case they submit, the Committee will be unable to pass on the matter of responsibility.

JOS. W. TAYLOR,
Secretary.

CODE OF RULES

GOVERNING THE CONDITION OF, AND REPAIRS TO,
FREIGHT CARS FOR THE INTERCHANGE
OF TRAFFIC,

ADOPTED BY THE

MASTER CAR BUILDERS' ASSOCIATION.

REVISED AT ATLANTIC CITY, N. J., JUNE, 1908.

PREFACE.

These rules make car owners responsible for, and therefore chargeable with, the repairs to their cars necessitated by ordinary wear and tear in fair service, so that defect cards will not be required for any defects thus arising.

Railroad companies handling cars are responsible for damage done to any car by unfair usage, derailment or accident, and for improper repairs made by them, and they should make proper repairs at their own expense, or issue defect card covering all such damage or improper repairs.

All inspection of freight cars for interchange will be made in accordance with the following rules.

CARE OF FOREIGN FREIGHT CARS.

RULE 1. **Each railway company shall give to foreign cars,** while on its line, the same care as to oiling, packing, inspection and adjusting brakes, that it gives to its own cars.

INTERCHANGING FREIGHT CARS.

RULE 2. **Cars offered in interchange must be accepted if in safe and serviceable condition, the receiving road to be the judge** in cases not provided for in Rules 3 to 56, inclusive.

In case cars are rejected by the receiving road and returned to the delivering company, all the defects objected to must be designated on a return card 3½ by 8 inches, of the following form, filled in with ink or black indelible pencil, and placed on the car adjacent to the destination card:

RETURN CARD.

.... Car No. ....

from .... Ry.,

to .... Ry.

for the following defects: ....

....

....

....

....

....

....

Inspector.

INSTRUCTIONS FOR INSPECTORS.

USE OF DEFECT CARD.

RULE 3. Defect cards shall be 3½ inches by 8 inches, and of the form shown below. They should be printed in red ink on both sides, and shall be filled in on both sides with ink or black indelible pencil. The cards must plainly specify in full each item for which charges are authorized, indicating on which end of the car the defects exist. The end of the car upon which the brake staff is located shall be known as "B" end, and the opposite end shall be known as "A" end. Where there are two brake staffs on same car, the end toward which the cylinder push rod travels shall be known as "B" end.

NOTE.—Fill in defects on both sides with ink or black indelible pencil. Attach this card with four tacks on outside face of intermediate sill, between cross-tie timbers.

M. C. B. DEFECT CARD.

(*Name of Road.*)

Date......................

Car specified below will be received at any point on this company's line with the following defects:

....

....

....

Car No............. Initials.......................

Inspector at.......................

RULE 4. Defect cards shall not be required for defects for which owners are responsible, except for missing material on cars offered in interchange, as provided for in Rules 27, 32, 35 and 42; neither shall they be required of the delivering road for improper repairs that were not made by it, with the exception of the cases provided for in Rules 29, 34, 43, 44 and 45.

RULE 5. If a car has defects for which the owners are not responsible, but which do not render it unsafe to run, nor unsafe to trainmen, nor to any lading suitable to the car, the receiving road may require that a defect card be securely attached to the car with four tacks, preferably on the outside face of intermediate sill, between cross-tie timbers, on wooden cars; and on steel cars to cardboard located either on crosstie under car or on inside of side sill at the end of car.

RULE 6. Duplicate defect cards shall be furnished for lost or illegible cards.

WHEELS.

DEFECTS OF WHEELS WHICH JUSTIFY RENEWAL.

RULE 7. Shelled out: wheels with defective treads on account of pieces shelling out; if the spots are over 2½ inches, or are so numerous as to endanger the safety of the wheel.

RULE 8. Seams ½ inch long or over at a distance of ½ inch or less from the throat of the flange, or seams 3 or more inches long if such seams are within the limits of 3¾ inches, as shown on Fig. 5.

RULE 9. Worn through chill: when the worn spot exceeds 2½ inches in length. Care must be taken to distinguish this defect from flat spots caused by sliding wheels.

RULE 10. Worn flange: cast wheels under cars of less than 80,000 pounds capacity, with flanges having flat vertical surfaces extending more than 1 inch from tread, or flange 15-16 inch thick or less, gauged at a point ⅜ inch above tread. Wheels under cars of 80,000 pounds capacity or over, with flanges having flat vertical surfaces extending more than ⅞ inch from tread, or flange less than 1 inch thick, gauged at a point ⅜ inch above tread (See Figs. 4 and 4 a.)

Worn flange: steel and steel-tired wheels with flanges having flat vertical surfaces extending more than one inch from tread, or flange 15-16 inch thick or less. (See Figs. 4 and 4 a.)

RULE 11. Thick flange: flange over 1 7-16 inches thick for cast-iron wheels, standard of 1903, 1904, 1905 and 1906 (See Fig. 2), or flange over 1 11-32 inches thick for cast-iron wheels having increased flange and tread standard of 1907. (See Fig. 2 a.)

Owners responsible.

Owners responsible.

Rule 12. Tread worn hollow: if the tread is worn sufficiently hollow to render the flange or rim liable to breakage.

Rule 13. Burst: if the wheel is cracked from the wheel fit, outward, by pressure from the axle.

Rule 14. Cracked or broken flange, caused by seams, worn through chill or worn flange. See also Rules 20 and 21.

Rule 15. Broken or chipped rim, caused by defective casting, if the tread, measured from the flange at a point ⅝ inch above tread, is less than 3¾ inches in width. (See Fig. 5.) See also Rules 20 and 21.

Rule 16. Cracked tread, cracked plate, one or more cracked brackets, or broken in pieces under fair usage. See also Rule 20.

Steel or steel-tired wheels loose, broken or cracked hubs, plates, bolts, retaining ring or tire under fair usage.

Rule 17. Wheels loose or out of gauge. (See Fig. 6.)

Rule 18. Chipped flange: if chip is on the opposite side from throat of flange and exceeds 1½ inches in length and ½ inch in width, or if it extends ⅛ inch past the center of flange.

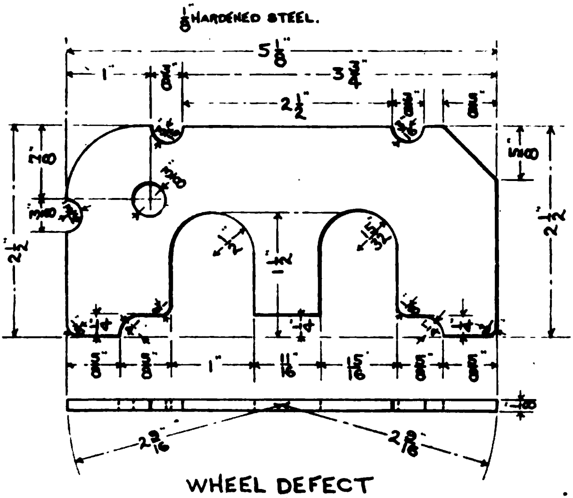
Delivering Company responsible.

Rule 19. Flat sliding: if the spot caused by sliding is 2½ inches or over in length. (Care should be taken to distinguish this defect from *worn through chill.*)

Rule 20. Broken flange, except as in Rule 14; chipped flange, if chip is on throat side of flange, and exceeds 1½ inches in length and ½ inch in width, or if it extends ⅛ inch past the center of flange; broken rim, if not caused by defective casting, if the tread, measured from the flange at a point ⅝ inch above tread, is less than 3¾ inches in width (see Fig. 5), or any breakage caused by unfair usage, derailment or accident.

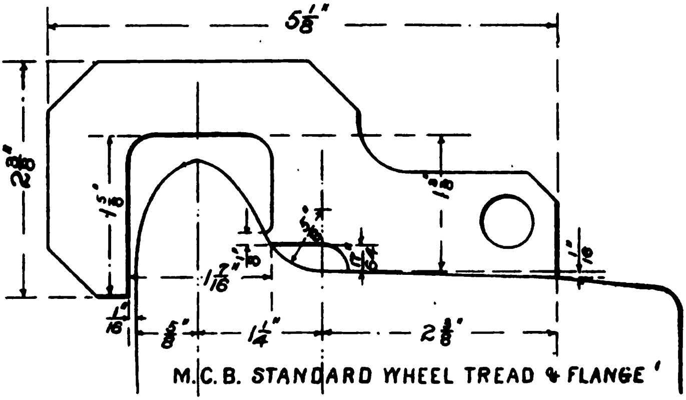
Rule 21. The determination of flat spots, worn flanges and chipped treads shall be made by a gauge as shown in Fig. 1. The determination of thick flanges shall be made by a gauge as shown applied to M. C. B. standard wheel tread and flange in Figs. 2 and 2 a.

The following engravings of the wheel defect gauge, Fig. 1, show the method of using it:



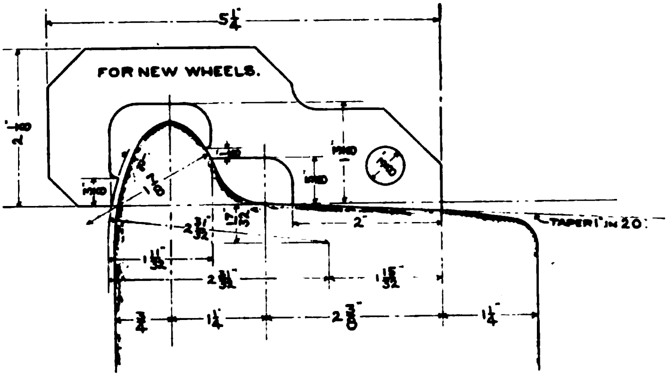
WHEEL DEFECT
AND
WORN COUPLER LIMIT GAUGE.

Fig. 1.



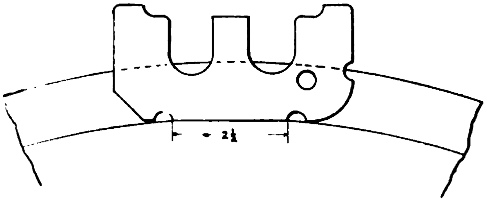
MAXIMUM FLANGE THICKNESS GAUGE.

Fig. 2.



MAXIMUM FLANGE THICKNESS GAUGE.

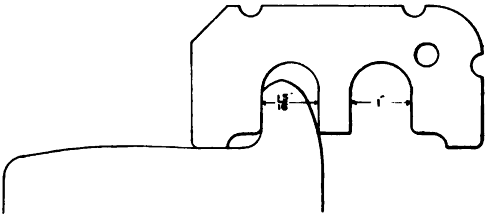
FIG. 2-A.



METHOD OF GAUGING SHELLED AND FLAT SPOTS

FIG. 3.

SEE RULES 7 AND 19.

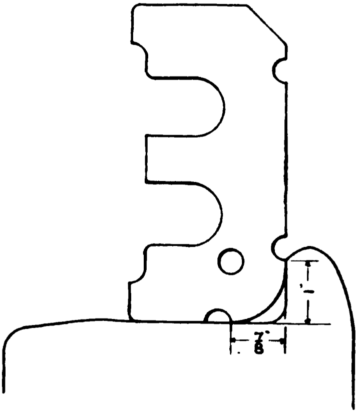


METHOD OF GAUGING WORN FLANGES

FIG. 4.

SEE RULE 10.

For wheels under cars of less than 80,000 pounds capacity, and steel or steel-tired wheels with flanges 15/16 inch thick or less; 80,000 pounds capacity or over, with flanges less than 1 inch thick

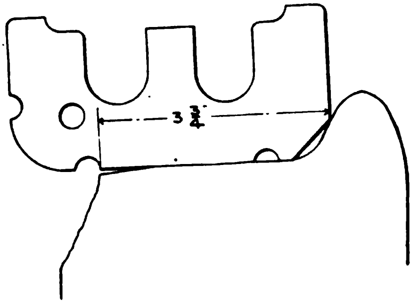


METHOD OF GAUGING WORN FLANGES.

FIG. 4 *a*.

SEE RULE 10.

For wheels under cars of less than 80,000 pounds capacity, and steel or steel-tired wheels 1 inch from tread; 80,000 pounds capacity or over, ⅞ inch from tread.



METHOD OF GAUGING CHIPPED RIMS.

FIG. 5.

SEE RULES 15 AND 20.

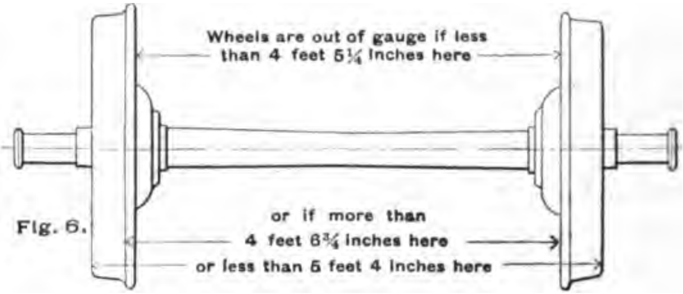

Wheels are out of gauge if less than 4 feet 5¼ inches here
or if more than 4 feet 6¾ inches here
or less than 5 feet 4 inches here

Fig. 6.

Measurements to be made at the same height on the wheels as the Center of the axle.

For wheels cast prior to the M. C. B. standard tread and flange adopted in 1907.

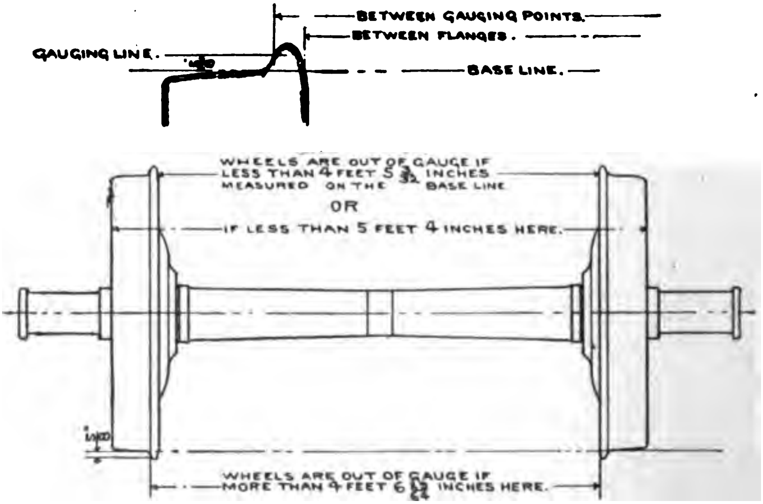

BETWEEN GAUGING POINTS.
BETWEEN FLANGES.
GAUGING LINE.
BASE LINE.
WHEELS ARE OUT OF GAUGE IF LESS THAN 4 FEET 5 3/32 INCHES MEASURED ON THE BASE LINE
OR
IF LESS THAN 5 FEET 4 INCHES HERE.
WHEELS ARE OUT OF GAUGE IF MORE THAN 4 FEET 6 13/64 INCHES HERE.

FIG. 6-A.

Measurements to be made at same height on the wheels as the center of the axle.

For wheels cast after January 1, 1908.

AXLES.

AXLES WHICH JUSTIFY RENEWAL.

RULE 22. Axles broken or having seamy or pitted journals, fillets in back shoulder worn out, or collars broken off or worn to ¼ inch or less, under fair usage.

RULE 23. Axles less than the following prescribed limits:

FOR CARS MARKED WITH "CAPACITY."

CAPACITY OF CAR.	JOURNAL.	WHEEL SEAT.	CENTER.
100,000	5 inches.	6¾ inches.	5⅞ inches.
80,000	4½ "	6¼ "	5 5/16 "
70,000	4 "	5⅝ "	4⅞ "
60,000	3¾ "	5 "	4⅜ "
50,000	3½ "	4¾ "	4⅛ "
40,000	3¼ "	4⅝ "	3⅞ "
30,000	3 "	4¼ "	3½ "

FOR CARS MARKED "MAXIMUM WEIGHT."

MAXIMUM WEIGHT.	JOURNAL.	WHEEL SEAT.	CENTER.
161,000	5 inches.	6¾ inches.	5⅞ inches.
132,000	4½ "	6¼ "	5⅜ "
112,000	4¼ "	6 "	5¼ "
95,000	3¾ "	5½ "	4¾ "
79,000	3½ "	5¼ "	4⅝ "
66,000	3¼ "	4⅞ "	4¼ "
58,000	3 "	4¾ "	4⅛ "

All cars to have their light weight and capacity or their light weight and maximum weight stenciled on them.

Owners responsible.

RULE 24. Cut journals, axles bent or axles rendered unsafe by unfair usage, derailment or accident.

Delivering Company responsible.

TRUCKS.

PARTS OF TRUCKS WHICH JUSTIFY REPAIRS IF OWNERS ARE RESPONSIBLE, OR REPAIRS OR CARDING IF DELIVERING COMPANY IS RESPONSIBLE.

RULE 25. Defective, missing or worn-out parts of trucks not elsewhere provided for, which have failed under fair usage, or if any part of the truck frame or attachments is less than 2½ inches above the top of the rail.

Owners responsible.

RULE 26. Damage of any kind to the truck due to unfair usage, derailment or accident.

Delivering Company responsible.

RULE 27. Material missing from trucks of cars offered in interchange.

Delivering Company responsible.

RULE 28. Journal bearings and journal box bolts which require renewal by reason of change of wheels or axles for which the delivering company is responsible, regardless of the previous condition of the bearings.

RULE 29. Cars equipped with steel or steel-tired wheels and so stenciled, if found with cast-iron wheels.

BRAKES.

PARTS OF BRAKES WHICH JUSTIFY REPAIRS.

Owners responsible.

RULE 30. Damage to interior portion of cylinder or triple valve, leaky pipes, account of seams, air hose burst from air pressure, torn air hose and defective missing or worn-out parts of brakes not elsewhere provided for, which have failed under fair usage; except burst or torn air hose, burst or leaky pipes, account of seams, or missing material on cars offered in interchange.

RULE 31. Cylinder or triple valves of air-brake cars not cleaned, oiled and tested within twelve months and the date of last cleaning, oiling and testing, preferably marked on the brake cylinder or auxiliary reservior, or if same is not readily visible, in a convenient location at release rod, with white paint.

Owners responsibility qualified.

RULE 32. If the car has air-signal or steam pipes the hose, pipes and couplings on the car are at owner's risk, unless the car is stenciled that it is so equipped.

Owners responsible.

RULE 33. Cars equipped with air-brake hose other than M. C. B. Standard and hose applied without swelled end and not conforming to M. C. B. standard hose on and after June 1, 1909,

Delivering Company responsible.

except cars offered in interchange, where delivering company is responsible.

RULE 34. If 1-inch hose and fittings are found on 1¼-inch train pipe.

RULE 35. Missing air-brake hose, missing or damaged air-brake pipe, fittings, angle cocks, cut-out cocks, cylinders, reservoirs, triple valves, release valves, pressure-retaining valves or any parts of these items; also pressure-retaining valve and pipe when damage to car denotes rough usage.

RULE 36. Damage to any part of the brake apparatus caused by unfair usage, derailment or accident.

RULE 37. All freight cars offered in interchange must be equipped with air brakes. On and after September 1, 1909, M. C. B. standard 1¼-inch train line shall be used.

BODIES.

PARTS OF BODIES WHICH JUSTIFY REPAIRS IF OWNERS ARE RESPONSIBLE, OR REPAIRS OR CARDING IF DELIVERING COMPANY IS RESPONSIBLE.

RULE 38. Locks, side doors, end doors, roof doors, grain doors and all inside or concealed parts of cars missing or damaged under unfair usage, and failure or loss under fair usage of any part of the body of the car, except as provided for in Rules 42 and 87.

All cars not originally equipped with retaining valves.

RULE 39. Cars not within the limits of standard height for couplers, 31½ inches to 34½ inches for standard gauge cars.

RULE 40. Steps, ladders, handholds or running boards in bad order or insecurely fastened, or absence of grabirons or handholds as required by law. Handholds or grabirons must be of wrought iron or steel and secured by bolts, rivets or lag screws.

Owners responsible.

RULE 41. Damage of any kind to the body of the car due to unfair usage, derailment or accident; also temporary advertisements tacked, glued, pasted or varnished on cars. Any card or poster which bears the name of a manufacturer or shipper printed on same will be considered as an advertisement.

RULE 42. Material missing from body of cars offered in interchange, except locks, grain doors and all inside or concealed parts of car.

RULE 43. M. C. B. couplers not equipped with steel or wrought-iron knuckles.

RULE 44. Cars intended to be equipped with metal brake beams and so stenciled, if found with wooden brake beams.

RULE 45. Cars equipped with M. C. B. couplers having pocket rear-end attachments and so stenciled, if found, with stem or spindle attachments instead of pocket.

RULE 46. Uncoupling attachments of M. C. B. couplers offered in interchange must be made operative before moving from interchange points.

Delivering Company responsible.

IMPROPER REPAIRS.

RULE 47. Any company making improper repairs is solely responsible to the owners, with the exception of the cases provided for in Rules 29, 34, 43, 44, 45 and 46, and also in case it should be necessary to replace stem or spindle with pocket attachment.

RULE 48. The company making such improper repairs shall place upon the car, at the time and place that the work is done, an M. C. B. defect card, which card shall state the wrong material used.

Company making repairs responsible.

COMBINATIONS OF DAMAGES WHICH DENOTE UNFAIR USAGE IF OCCURRING AT THE SAME END OF CAR.

RULE 49. Damage to coupler, accompanied by damage to either combined front and back coupler stop, draft timber, or its substitute, or end sill.

RULE 50. Damaged coupler pocket, accompanied by damage to either draft timber or its substitute, or end sill.

RULE 51. Damaged combined front and back coupler stop, accompanied by damage to either coupler or end sill.

RULE 52. Damaged draft timber or its substitute, accompanied by damage to either coupler, coupler pocket or to end sill.

RULE 53. Damaged end sill, accompanied by damage to either coupler, coupler pocket, combined front and back coupler stop, draft timber or its substitute or longitudinal sill.

RULE 54. Damaged longitudinal sill, accompanied by damage to end sill.

RULE 55. Damaged longitudinal sills, if necessitating replacement or splicing of more than two sills.

RULE 56. Damaged corner and end posts, if necessitating the replacement of, or repairs to, more than two end or two corner posts at one end, or more than one end and one corner post at same end of car.

The word "coupler" in the above Rules 49 to 53, inclusive, means the coupler body or knuckle, open knuckles excepted.

An American continuous draft key and rod shall not enter into a combination of defects denoting unfair usage.

It will be assumed that a missing coupler and attachments are damaged unless shown to the contrary. This only refers to cases where the coupler if broken would enter into the combination of defects.

INSTRUCTIONS TO REPAIR MEN.

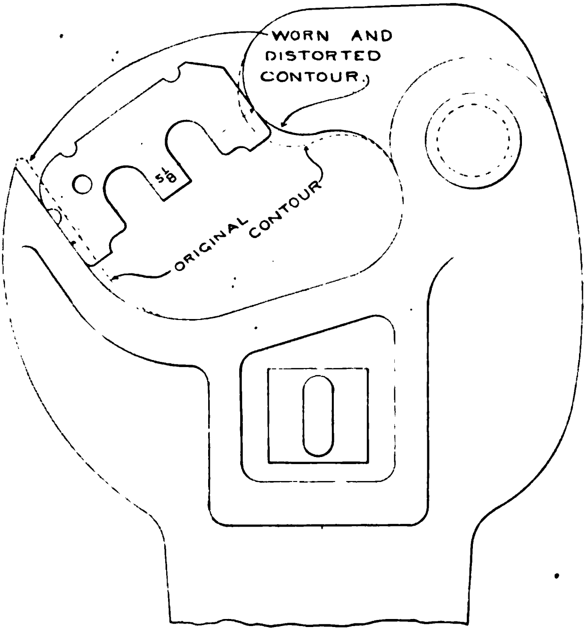
RULE 57. Any car having defects which render it unsafe to run, unsafe to trainmen, or to any lading suitable to the car, may be repaired.

RULE 58. Repairs to foreign cars shall be promptly made, and the work shall conform in detail to the original construction, and with the quality of material originally used, except as provided for in Rules 59 and 62. Malleable iron, M. C. B. standards, may be substituted for gray iron, M. C. B. standards, but the net cost to car owner in such cases must be no greater than if the original kind and weight of material had been applied. Gray iron, M. C. B. standards, may be substituted in place of malleable, M. C. B. standards, but in such cases the debits and credits must be for what is actually applied and removed. Repair cards and stubs must state kind of material applied and removed.

RULE 59. In repairing damaged cars, M. C. B. standards may be used when of dimensions that do not impair the strength of the cars, in lieu of the parts forming its original construction. In making repairs, cast-iron brake shoes may be replaced with reinforced brake shoes. When using materials for repairs to foreign cars for which the Master Car Builders' Association has adopted specifications as a standard, the materials must comply with the requirements of these specifications.

Rule 60. In making repairs for which owners are responsible, wheels other than 33-inch may be replaced with 33-inch wheels, if practicable. If changes are necessary in order to bring the car to the proper height, the cost of so doing shall also be chargeable to the car owner.

Rule 61. Couplers of the vertical plane type other than M. C. B., replaced with M. C. B. standard, the expense of alteration thus necessitated shall be chargeable to car owners. Couplers that exceed the distance of 5⅛ inches between point of knuckle and guard arm measured perpendicularly to guard arm must be repaired. (See drawing.)



Rule 62. When M. C. B. couplers of another make are placed upon a car, the uncoupling arrangements shall be made

operative at the expense of the company making the repairs. Malleable iron couplers, open knuckles and malleable or steel backed filled journal bearings shall not be used in repairs of foreign cars.

RULE 63. **When M. C. B. couplers, knuckles, metal brake beams, wheels or axles are replaced under conditions which make them chargeable to the owner, it must be plainly stated on the repair card and stub whether the material is new or secondhand.**

The cards and stubs must state whether solid or filled journal bearings are applied or removed; also, length of bearing. In the case of couplers applied and removed, they shall state the make and kind of material in couplers and the size of shank. In the case of knuckles, they must state whether open or closed knuckles are removed and applied. In the case of brake shoes removed and applied, they shall state the kind of shoe.

RULE 64. **Any company finding cars not within the limits of standard height for couplers may make repairs and charge to owners. Cars should be adjusted in height when empty, as far as possible, and in order to justify a bill for this work under the Rules of Interchange an empty car measuring 32½ inches or less should be adjusted to 34½ inches, or within ¼ inch thereof, and when it is necessary to alter a loaded car it should be adjusted to 33½ inches, or within ¼ inch thereof, or as nearly as possible to such height as will bring it to 34½ inches when the car is unloaded, the height to be measured from top of the rails to the center line of the coupler shank.**

RULE 65. Draft timbers must not be spliced. All longitudinal sills may be spliced once, with the exception of center sills, which may be spliced at both ends. Not more than two adjacent sills may be spliced at the same end of car.

The splice may be located either side of body bolster, but the nearest point of any splice must not be within 12 inches of same, excepting center sills, which must be spliced between body bolster and cross-tie timbers and not within 24 inches of either.

Longitudinal sills other than center sills where less than 12 inches in depth, the plan shown in Fig. 8 is to be followed. When the sills are 12 inches or more in depth the plan shown in Fig. 9 is to be followed. When center sills are spliced the plan shown in Fig. 9a is to be followed.

The size of horizontal or cross bolts shown in Fig. 9a should be ⅝ inch.

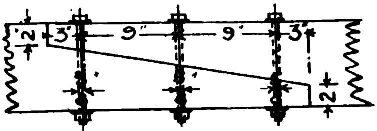


FIG. 8.

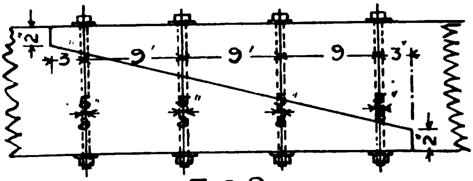


FIG. 9.

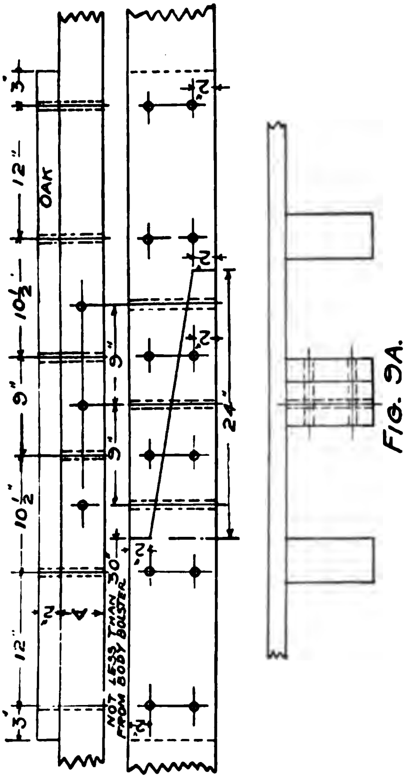


FIG. 9A.

The size of horizontal or cross bolts to be ⅝ inches.

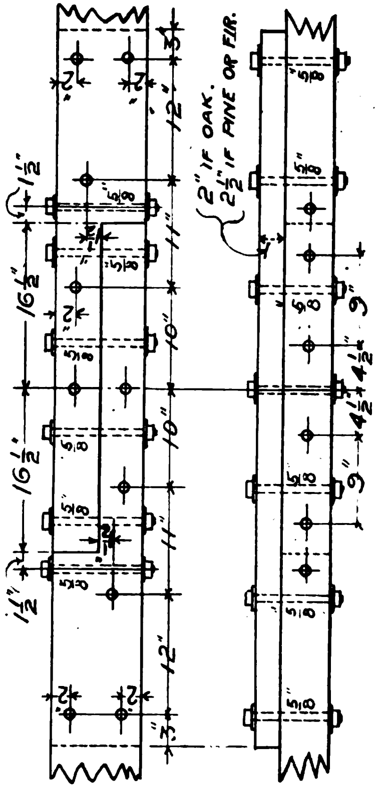


FIG. 9-B.

Sills of foreign cars shall be spliced in accordance with the standard form of splice shown above. Cars delivered in interchange with the form of splice shown in Fig. 9-B will be acceptable.

Steel sills may be spliced in the most convenient location in accordance with Figs. A, B and C. Adjacent steel sills may be spliced.

RULE 66. Wheels on the same axle must be of the same circumference.

RULE 67. New wheels must not be mated with secondhand wheels.

RULE 68. Prick punching or shimming the wheel fit must not be allowed.

RULE 69. The wheel seats of foreign axles must not be

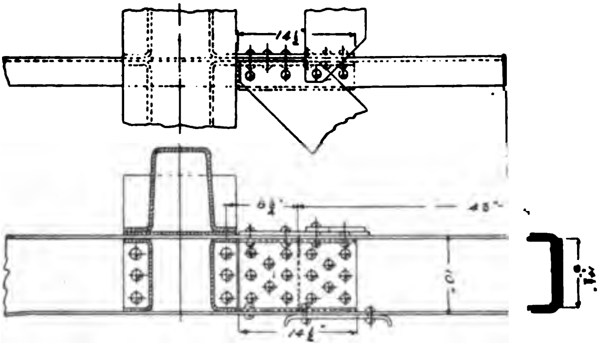


Fig. A.

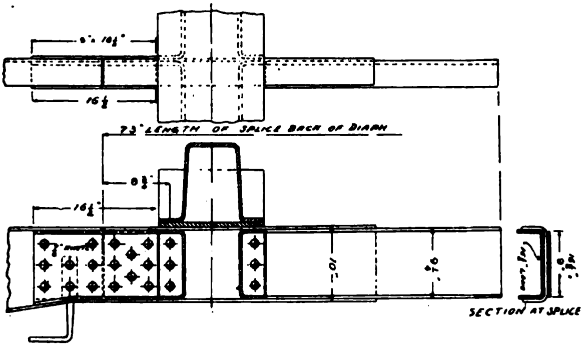


Fig. B.

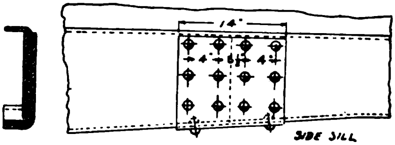


Fig. C.

reduced more than 1-16 inch to fit the wheels, and in no case must they be reduced below the limits given in Rule 23.

Rule 70. Any company repairing foreign cars with wrong material, and not in compliance with the Rules 57 to 70, inclusive, shall be liable to the owners for the cost of changing such car to the original standard, or to the requirements of these rules, except that companies applying axles smaller than the limits given in Rule 23 shall not be held responsible for improper repairs if the car is not stenciled showing the capacity of the car.

RULE 71. In replacing air-brake hose on foreign cars for which bills are made, new hose must be used.

Air-brake hose applied to foreign cars shall be considered wrong repairs unless they are made in accordance with the M. C. B. specifications and are so labeled.

RULE 72. If the weight of a car is found to vary more than 500 pounds from the light weight stenciled on the car, or if the light weight is obliterated, a railroad company having the car in its possession may weigh and restencil the car, making a charge for each car weighed and so reported. The railroad company making the bill shall notify the owner, giving the date and point at which the reweighing was done.

RULE 73. Cars undergoing extraordinary repairs, such as sills, resheathing, roofing, etc., must be reweighed and restenciled by the company having the car in its possession at its own expense, and the owner notified.

RULE 74. When secondhand axles are applied under conditions which make them chargeable to the owners, the diameters of the wheel seats and center must not be less than, and the diameter of the journal must be ⅛ inch greater than the limiting diameters given in Rule 23. If cars are marked with the word "Capacity," the first set of limits must be followed. If cars are marked "Maximum Weight," the second set of limits must be followed.

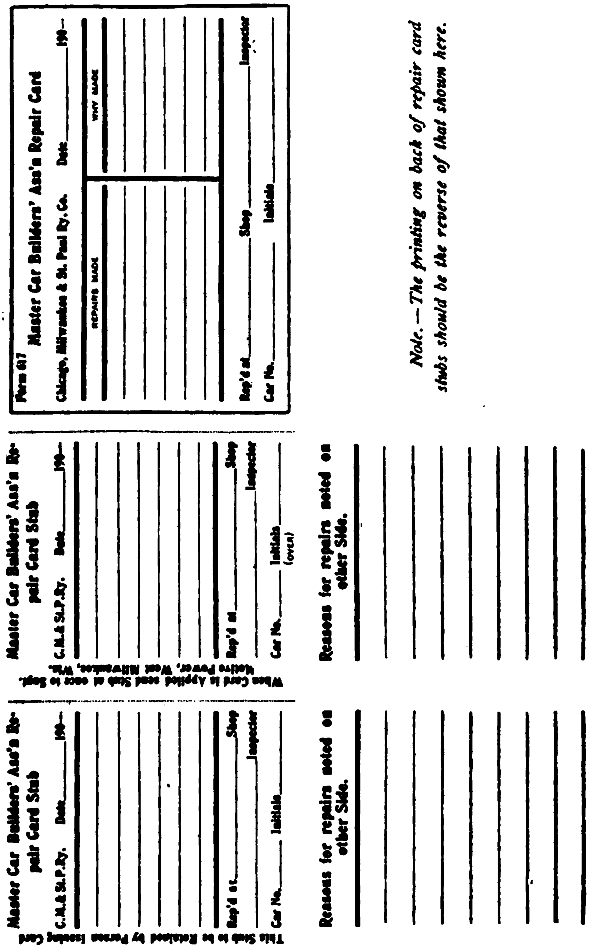
RULE 75. When two or more cars chained together, or any cars which require switch chains to handle them, are delivered at an interchange point, the receiving road shall deliver to the delivering road at the time, an equivalent number of switch chains of the same size as the chains so used on the cars delivered, or, in lieu thereof, furnish a defect card for such chains.

USE OF REPAIR CARD.

RULE 76. When repairs of any kind are made to foreign cars a repair card shall be securely attached to outside face of intermediate sill between cross-tie timbers on wooden cars, and on steel cars to cardboard located either on crosstie under car or on inside of side sill at the end of car. This card shall specify fully the repairs made, and reason for same, the date and place where made, and name of road making repairs; also show location of parts repaired or renewed. The end of car on which brake staff is located shall be known as "B" end, and the opposite end as "A" end. Where there are two brake staffs on the car, the end toward which the cylinder push rod travels shall be known as "B" end. The card shall be provided with a stub, which will duplicate information on the card, and stubs must be forwarded with the bill.

If no bill is to be rendered, the repair card stub must be forwarded on or before the twentieth day of each month, with the words "no bill" written across the face of the repair card stub. In case it is not the intention to render bill, the words "no bill" shall be written across the face of the repair card.

RULE 77. The repair card shall be 3½ by 8 inches, and the stub 3½ by 4 inches. The card shall be printed on both sides in black ink, and shall be filled in on both sides with ink or black indelible pencil, and be of the following form:



Form 617

Master Car Builders' Ass'n Repair Card

Chicago, Milwaukee & St. Paul Ry. Co. Date__________190—

REPAIRS MADE	WHY MADE

Rep'd at__________Shop__________Inspector

Car No.__________ Initials__________

Master Car Builders' Ass'n Repair Card Stub

C.M.& St.P.Ry. Date__________190—

Rep'd at__________Shop

__________Inspector

Car No.________ Initials________

(OVER)

When Card is Applied send Stub at once to Supt. Motive Power, West Milwaukee, Wis.

Reasons for repairs noted on other Side.

Master Car Builders' Ass'n Repair Card Stub

C.M.& St.P.Ry. Date__________190—

Rep'd at__________Shop

__________Inspector

Car No.________ Initials________

This Stub to be Retained by Person Issuing Card

Reasons for repairs noted on other Side.

Note.—The printing on back of repair card stubs should be the reverse of that shown here.

Rule 78. Any road making partial repairs of defects on a car which are covered by defect cards will have the defects repaired crossed off the original card with ink or indelible pencil and card placed back on car. A copy of the card accompanying the bill with the defects which were not repaired crossed off will be sufficient authority to bill.

Rule 79. Duplicate repair cards shall be furnished for lost or illegible cards.

INSTRUCTIONS FOR BILLING.

Rule 80. Bills may be rendered for work done under Rule 57, except in cases where owners are not responsible and the car bears no defect card covering the defects repaired, stating upon the bill the date and place where the repairs were made; the repair card stub or defect card to accompany the bill.

Rule 81. Car owners may require receipt of repair card or stub before payment of bill for repairs.

Rule 82. For repairs made on defect cards, the card must accompany the bill as voucher for the work done, but no bill shall be rendered for repairs which have not been made.

Rule 83. When improper repairs of owner's defects have been made and bill rendered, the owner may counter bill against the company making the wrong repairs for the cost of changing the car to the original standard, or to the requirements of Rules 57 to 79, inclusive, if the work is done.

Rule 84. When improper repairs of defects for which owners are not responsible are made, the owner may make bill against the company making the improper repairs for the cost of changing the car to the original standard, or to the requirements of Rules 57 to 79, inclusive, if the work is done.

Rule 85. The evidence of a joint inspector or the joint evidence of two persons, one representing the owner of the car and the other representing the delivering road, that the repairs are not proper, shall be final. A joint evidence card shall be used for this purpose, which shall describe and show location of parts repaired or renewed. The end of the car on which the brake staff is located shall be known as " B " end, and the opposite end as "A" end. Where there are two brake staffs on the car, the end toward which the cylinder push rod travels shall be known as " B " end. This card shall be of the following form:

THE...RAILWAY CO.

REPORT OF IMPROPER REPAIRS TO................CARS

Station...*190*..

Car No......*Initial*......*Received from*.......................*Ry.* *At*.............*Date*.............*190*..

Description of wrong Repairs....................	*How Repairs should be made*....................
....	....
....	....
....	....
....	....
....	....
....	....
....	....

Show how Carded on other Side.
We Certify Above to be Correct.

.... *Inspector for* ....*Ry.*
.... *Inspector for* ....*Ry.*

THE..RAILWAY CO.

M. C. B. DEFECT CARD. *Issued by*......................*Ry.* *At*..............*Date*...............*190* .

Inspector........................*Reading as follows*..

....

....

....

....

....

M. C. B. REPAIR CARD. *Issued by*......................*Ry.* *At*..............*Date*...............*190*..

Inspector........................*Reading as follows*..

....

....

....

....

DISPOSITION OF CAR. *Carded to*......................*Shop; Repaired; went forward without Repairs.*

Rule 86. The joint evidence card, accompanied by a proper repair card, upon which a bill has been made, shall be used as authority for rendering bill, but if unaccompanied by such repair card, the joint evidence card shall be sent to the company against which the evidence has been presented, and it shall furnish a defect card covering the wrong repairs if it made them.

Rule 87. Bills may be rendered against car owners for the labor only of replacing couplers, brake beams (including their attachments, such as shoes, heads, key bolts, brake pins, jaws and hangers), brake levers, lever guides, top and bottom brake rods that have been lost on the line of the company making the repairs. Coupler springs, followers and yokes may be included in the above, providing they have been lost with the couplers.

Rule 88. In making bills under these rules, the information necessary for the car department should be embodied on the following forms, whether the same is made as a bill or a statement to accompany a bill:

....*Company,*
Address..
To..*Railroad Company, Dr.*
For Wheels and Axles put under..*Cars, Month of*..*190*

Date and Place.	Initial, Kind and Number of Car.	WHEELS AND AXLES REMOVED.					WHEELS OR AXLES APPLIED.							
		Maker.	Date Cast.	No. on Wheel or Axle	Cause of Removal.	Shop Marks on Wheels and Axles.	Maker.	Date Cast.	No. on Wheel or Axle	New or Second Hand.	Shop Marks on Wheels and Axles.	Material Net Charge.	Labor Charge.	Total Net Charge.

Date..*190*

Received payment, $..

....

STATEMENT OF REPAIRS MADE PER M. C. B. RULES TO............CARS

BY________________________________RAILWAY CO.

DURING______________________189__

Repairs made		CAR		DESCRIPTION OF PARTS REPAIRED	Value of [illegible] Material	IRON			BRASS							CREDIT FOR SCRAP					
Date	Place	Initials	Number			Cast	Wrot.	Mall.	Filled	Solid	Chain	Lumber	Spring		Labor	Cast	Wrot. and Steel	Mall.	Steel Springs and Chains	Solid Brass	Filled Brass
						Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Feet	Lbs.		Hours	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
				QUANTITY,																	
				PRICE,											20c.						
				VALUE,																	
																	Total.				
																	Less for Scrap.				
																	Net Charge.				

RULE 89. Bills rendered for wheels and axles shall be in accordance with the following schedule of prices for material, with the proper debits and credits:

	NEW.	SECOND-HAND.	SCRAP.
One 36-inch cast-iron wheel.......	$10.50	$7.75	$5.25
One 33-inch cast-iron wheel.......	9.00	7.00	4.75
One 33-in. steel or steel-tired wheel	23.00	17.25	5.00
One axle, 100,000 lbs	21.50	11.75	7.75
One axle, 80,000 lbs	17.75	10.00	6.50
One axle, 60,000 lbs	14.00	7.75	5.25
One axle, 50,000 lbs. (or under)	11.50	6.25	4.25

and with an additional charge for all labor for each pair of wheels and axles removed from all arch bar trucks of $1.75, and from all solid pedestal trucks of $2.00. If new wheels and axles are substituted for secondhand wheels and axles, proper charges and credits shall be allowed, although such substitution be made on account of only one loose or defective wheel, or a defective axle, with the following exceptions: In case the owner of a car removes a damaged wheel or axle, no charge shall be made for any difference in value between the parts used and those removed that are not damaged.

Removing, turning and replacing a pair of steel or steel-tired wheels: $3.25 for pedestal type of truck and $3.00 for archbar truck.

Loss of service metal from steel or steel-tired wheels for defects for which the delivering company is responsible, to be charged for at the rate of $1.50 per 1-16 inch thickness of tread or tire.

RULE 90. If car owner elects on account of improper repairs to remove M. C. B. standard axles suitable to the capacity of the car, he shall make charge for secondhand axles and allow credit for secondhand axles if they are in good order. Axles removed below the journal limit of 100,000 pounds, 80,000 pounds, 60,000 pounds and 40,000 pounds capacity to be credited as scrap when removed.

RULE 91. Bills for wheel and axle work must make specific mention of each axle and wheel removed or applied.

RULE 92. Bills which do not embody all the information called for by the headings of the columns may be declined until made to conform to the requirements of the rule. If no marks are found on wheels or axles removed, a notation to that effect must be made on face of bill.

RULE 93. In noting on bills the cause of removal of wheels and axles, the terms used in Rules 7 to 24, inclusive, shall be used, and the dimensions of the defect or variation from the prescribed limits should be carefully specified.

RULE 94. Bills for repairs made under these rules and for material furnished shall be in conformity with schedules of prices and credits for the articles enumerated below:

MATERIAL.	8-INCH.	10-INCH.
Air-brake Equipment:		
Air-brake hose, 1¼ inch, complete with fittings applied to car charge	$2.00	$2.00
Air-brake hose, 1¼ inch, credit for fittings for same	.80	.80
Angle cock, plain handle	1.50	1.50
Angle cock, self-locking handle	1.80	1.80
Angle cock handle	.08	.08
Auxiliary reservoir	2.75	6.25
Cut-out cock	1.30	1.30
Cut-out cock handle	.07	.07
Cylinder, body	2.00	3.50
" piston and rod	1.00	1.50
" piston follower	.08	.25
" piston packing leather	.60	1.00
" " " " expander	.05	.06
" piston release spring	.50	.50
" non-pressure head	.60	1.25
" gasket	.06	.08
Gasket, air-hose coupling	.04	.04
Pipe, nipple on end of train pipe	.12	.12
Pressure-retaining valve, 2 position	1.00	1.00
Pressure-retaining valve, 3 position	2.25	2.25
Release valve	.60	.60
Release valve handle	.08	.10
Release rod	.10	.10
Spring cotter pins for key bolts and brake pins, each applied	.02	.02
Train pipe air strainer (1¼ inch)	.60	.60
Triple check valve case	.90	.90
Triple cylinder cap (drain cup)	.75	.75
" " " " gasket	.40	.40
" emergency valve	.60	.60
" " " seat	.55	.55
" " " piston	.50	.50
" " " rubber seat	.05	.05
" " check valve	.25	.25
" " " spring	.02	.02
" " " case gasket	.10	.10
" graduating spring	.05	.05
" " stem	.15	.15
" " " nut	.20	.20
" " valve	.05	.05
" piston and ring	2.00	2.00
" " ring (only)	.25	.25
" slide valve	.75	.75
" " " spring	.03	.03
" valve strainer	.05	.05
" " gasket	.20	.20
Bolts, nuts, and forgings, finished per lb.	.03	¾c.
Brake shoes applied; no credit for scrap	.30	....

Material.	Charge.	Credit.
Brake shoe, reinforced back, applied, no credit for scrap....	$0.40	....
Brake shoe key, applied; no credit for scrap	.05	....
Castings, rough iron.................................per lb.	.02	6/10c.
" " malleable .... "	.03½	½c.
" " steel .... "	.04½	¾c.
Chain .... "	.05	$0.01
Coupler, M. C. B., complete, new, steel, 5 by 5 shank........	8.75	....
Coupler, M. C. B., complete, new, steel, 5 by 7 shank........	9.50	....
Coupler body, one, new, steel, 5 by 5 shank......	6.50	1.05
Coupler body, one, malleable, 5 by 5 shank..................	....	.90
Coupler body, one, new, steel, 5 by 7 shank..................	7.75	1.15
Coupler body, one, malleable, 5 by 7 shank........	... .	1.00
Coupler knuckle, one, new, open	....	.40
Coupler knuckle, one, new, solid...........................	2.00	.45
Coupler knuckle pin, one, new	.25	.05
Coupler lock, one, new............	.40	.06
Other individual malleable, wrought or steel parts, per lb.	.04	....
Door, for end of box or stock car, wooden, each, applied; no credit for scrap	1.95	....
Door, for end of box or stock car, ventilated (wooden frame with iron rods), each, applied; no credit for scrap	3.30	....
Door, for side of box or stock car, wooden, each, applied; no credit for scrap	3.65	....
Door, for side of box or stock car, ventilated (wooden frame with iron rods), each, applied; no credit for scrap......	5.50	....
Door, for side of carriage, automobile or furniture car, wooden, each, applied, no credit for scrap............	5.00	....
Door, for side of stock car, with iron rods, each, applied; no credit for scrap	4.40	....
Door, for roof of coke car, wooden, each, applied; no credit for scrap	2.45	....
Door, for roof of stock car, wooden, each, applied; no credit for scrap	.85	....
Half door, for side of box or stock car, each, applied; no credit for scrap	2.50	....
Half door, for end of furniture or carriage car, each, applied; no credit for scrap	3.00	. ...
Hatch cover, for roof of refrigerator car, wooden, each, applied; no credit for scrap................................	1.50	....
Hatch plug, for refrigerator car, wooden, each, applied; no credit for scrap...	1.50	....
Iron, galvanized ....per lb.	.04	....
Journal bearings, brass or bronze, lined or unlined, per lb., applied.....	.20	.15
Journal bearings, filled brass or bronze shell, per lb., applied	.15	.11
The weight charged for new journal bearings for 7-inch journals and over, but not 8 inches long, shall be 10 pounds; for scrap bearings, 6 pounds. The weight charged for new journal bearings for journals 8 inches long and less than 9 inches long shall be 13 pounds; for scrap bearings, 8 pounds. For new journal bearings for journals 9 inches long or over, but not 10 inches, 20 pounds; for scrap bearings, 12 pounds. For new journal bearings for 100,000-pound capacity cars (5½ by 10 inches) the weight shall be 25 lbs.; for scrap bearings, 15 pounds.		
Journal bearings, cast steel or malleable iron back, credit for scrap, per pound.................	....	.04
Labor, per hour	.24	....
Lumber—yellow, white and Norway pine, poplar, oak, hickory and elm, dressed and framed, per ft. B. M., required to make the part............................	.03½	....
Nails ....per lb.	.03	....
Paint, lead, freight car, mixed...................... "	.15	....
Paint, mineral, freight car, mixed...... .... "	.05	....
Pipe, ⅜-inch, per foot....................................	.03	....
" 1-inch, "	.05	....
" 1¼-inch, "	.07	....
Steel for springs, rough...........................per lb.	.05	¾c.
" helical springs......... .... "	.03½	.01
" pressed and sheet.......................... "	.03½	½c.

RULE 95. Not more than one pound of mineral paint can be charged for 15 square feet of surface covered, and not more than one pound of lead paint for 12 square feet of surface covered. No charge to be made for lettering.

RULE 96. Whenever scrap credits are allowable, the weights of scrap credited shall be equal to the weights of the new metal applied, except as otherwise provided in the rules, and except in the case of scrap M. C. B. couplers, and parts of same, and material applied on defect cards, in which cases the weight and kind of metal removed shall be credited.

RULE 97. In the application of structural steel it should be charged out at the current market price plus the necessary labor for drilling, etc.; credit should be at prices quoted above for similar metal.

RULE 98. Bills shall not be rendered for amounts less than 25 cents in aggregate, but charges for items less than 25 cents may be held until they amount to that sum, provided said aggregate is rendered within sixty days. No bill shall be returned for correction on account of error for less than 100 cents in aggregate of bill, but said bill shall be passed for payment at once, and the alleged error brought to the attention of the road rendering the same within sixty days from date of bill. The receiving road shall at once issue a letter of authority for counter bill to cover the acknowledged error, said letter to be attached to the bill as authority.

No bills shall be returned for correction on account of wrong car numbers, but road rendering bill should be communicated with by letter, and if, after investigation, it is found to be a fact that wrong car number has been given, correct number shall be furnished or credit covering amount of charge allowed on next month's bill.

When necessary to return bills for correction, all defect cards and repair card stubs should be detached except those covering repairs to cars, the charge for which there may be some question as to its correctness.

RULE 99. All companies rendering bill should consolidate all charges against any one company into one monthly bill.

RULE 100. Journal bearings having a lining ⅜ inch thick or thicker, shall be charged as filled journal bearings, and not as lined journal bearings.

RULE 101. In rendering bills for owner's defects, the following should be observed.

No credit for scrap and no charge for labor shall be allowed in renewing brake shoes.

RULE 102. When M. C. B. coupler parts or metal brake beams are replaced, good secondhand material may be used, but they must be charged at seventy-five per cent of the prices when new. The credits for similar parts released from service in good condition must also be seventy-five per cent of the prices when new.

RULE 103. Manufactured articles not included in the above list must be charged at current market prices, without freight charges.

RULE 104. No percentage to be added to either material or labor.

RULE 105. Bills for the following work, to make cars conform to United States laws and to conform to the requirements of Rule 64, must be rendered within 60 days after the work is done, and must state the height of the car before and after altering:

Altering height of one end of one car, net	$1.25
Putting on one handhold or grabiron, net	.25

RULE 106. The following table shows the number of hours which may be charged for labor in doing the various items of work enumerated, which includes all work necessary to complete each item of repairs, except in so far as labor is already included in charges for materials:

	Ordinary Cars.		Refrigerator Cars.	
	Hrs.	Charge for Labor.	Hrs.	Charge for Labor.
Advertisements, temporary, tacked on cars, removing, per car	......	$0.50	......	$0.50
Advertisements, temporary, pasted, glued or varnished on cars, removing, per car	......	1.00	....	1 00
American continuous draft rods, one rod, welding	2	.48	2	.48
Arch bars, 1 or 2, replaced on same side of truck	3	.72	3	.72
Arch bar, upper or lower, or both, blacksmith shop labor, repairing	2	.48	2	.48
Axle, bent, straightening	4	.96	4	.96
Bolster, body, composite, one, replaced	10	2.40	12	2.88
Bolster, body, plain metal or wood, one, replaced.	8	1.92	10	2.40
Bolster, body, plain metal or wood, one, replaced when one or more defective sills are replaced.	2	.48	2	.48
Bolster, composite, one, replaced when one or more defective sills are replaced	4	.96	4	.96
Bolster, truck, one, replaced	10	2.40	10	2.40
Bolster, truck, one, and one spring plank in same truck, replaced	12	2.88	12	2.88
Brake beam, one, replaced	2	.48	2	.48
Brake beam, one, metal, blacksmith labor repairing	2	.48	2	.48
Brake beam, wooden truss, repairing	1	.24	1	.24
Brake hanger, repaired and replaced	1	.24	1	.24
Brake shoe, applied on authority of defect card, when brake beam is not replaced	½	.12	½	.12
Buffer blocks, cast-iron, each, replacing	1	.24	1	.24
Carlin, one, replaced	3	.72	..	....
Carrier iron bolts, three or less, at one end of car, applied	2	.48	2	.48
Carrier iron bolts, all at one end of car, applied	3	.72	3	.72

	Ordinary Cars.		Refrigerator Cars.	
	Hrs.	Charge for Labor.	Hrs.	Charge for Labor.
Carrier iron bolts, 4 inches long or less, each	¼	$0.06	¼	$0.06
Center pin head applied, empty car	½	.12	½	.12
" " " " loaded "	3	.72	3	.72
Center pin head applied, empty car, and putting same end on center	1½	.36	1½	.36
Center pin head applied, loaded car, and putting same end on center	5	1.20	5	1.20
Center pin key applied, empty car, including placing same end on center, if necessary	1½	.36	1½	.36
Center pin key applied, loaded car, including placing same end on center, if necessary	2½	.60	2½	.60
Center plates, one or two, at same end, replacing.	3	.72	3	.72
Center plate bolts, where same do not pass through draft timber, one or more, or all at same end	3	.72	3	.72
Center plate bolt or bolts and center plate replacing on one end of car	3	.72	3	.72
Column bolts, one or more, replaced in same truck	2	.48	2	.48
Corner iron, one, replaced	1	.24	1	.24
Corner post, one, replaced, empty car	3	.72	6	1.44
Corner post, one, replaced, loaded car	4	.96	6	1.44
Coupler with stem attachments, coupler springs, one or more follower plates, American continuous draft key, American continuous draft rods, one or more coupler stops, renewing or replacing any or all, at same end of car, at same time	3	.72	3	.72
Coupler, with pocket attachments, coupler spring, one or more follower plates, one or more coupler stops, coupler pocket, coupler pocket rivets, renewing or replacing any or all, at same end of car at same time	4	.96	4	.96
Coupler stop bolts, lug strap bolts or draft timber cross-tie bolts, 5 or less, at same end of car, when coupler is not replaced, each	½	.12	½	.12
Coupler stop bolts, lug strap bolts or draft timber cross-tie bolts, 6 or more, at same end of car, when coupler is not replaced.	3	.72	3	.72
Cross-tie timber, one, replaced	3	.72	3	.72
Cross-tie timber, one, replaced when one or more defective sills are replaced	1	.24	1	.24
Dead block, wooden, replacing at one end of car	3	.72	3	.72
Door, end, old, rehanging	½	.12	..	....
Door, side, old, rehanging	1	.24	1	.24
Door post, one, replaced, empty car	3	.72	6	1.44
Door post, one, replaced, loaded car	4	.96	6	1.44
Draft timber, one, replaced	7	1.68	7	1.68
Draft timbers, two, on same end, replaced	10	2.40	11	2.64
Draft timber, one, renewed, when upper center plate bolts pass through rear end of draft timbers	10	2.40	10	2.40
Draft timber, two, renewed, when upper center plate bolts pass through rear end of draft timbers	13	3.12	14	3.36
Draft timber, one, renewed, when its center sill is renewed or spliced at same end of car	2	.48	2	.48
Draft timber, one, renewed, when its opposite center sill at same end of car is renewed or spliced	3	.72	3	.72
Draft timber bolts complete, at one end of car, replacing	3	.72	3	72
Draft timber bolts, or carrier iron bolts, either or both, three or less, at one end of car, replacing.	2	.48	2	.48
Draft timber bolts, or carrier iron bolts, either or both, four or more, at one end of car, replacing.	3	.72	3	.72
Draft timber bolts, when same do not pass through upper center plate, three or less	2	.48	2	.48
Draft timber bolts, when same do not pass through upper center plate, four or more	3	.72	3	.72

	Ordinary Cars.		Refrigerator Cars.	
	Hrs.	Charge for Labor.	Hrs.	Charge for Labor.
Draft timber bolts, when one or more of the bolts pass through the center plate, add	3	$0.72	3	$0.72
(No additional charge to be made in this case, if one or more or all of the center plate bolts at same end of car are renewed.)				
Draft timber bolts, four or more at one end of car, replacing	3	.72	3	.72
End plank, one, renewed on gondola car—				
without angle irons	2	.48		
with angle irons, bolted	3	.72		
with angle irons, riveted	5	1.20		
End planks, two, renewed on same end—				
without angle irons	2½	.60		
with angle irons, bolted	3½	.84		
with angle irons, riveted	5½	1.32		
End planks, three, renewed on same end—				
without angle irons	3	.72		
with angle irons, bolted	4	.96		
with angle irons, riveted	6	1.44		
End planks, four, renewed on same end—				
without angle irons	3½	.84		
with angle irons, bolted	4½	1.08		
with angle irons, riveted	6½	1.56		
End plate, one, replaced	12	2.88	14	3.36
End post, one, replaced, empty car	3	.72	6	1.44
End post, one, replaced, loaded car	4	.96	6	1.44
Journal box, one, replaced	2	.48	2	.48
Journal boxes, two, on same axle, replaced	3	.72	3	.72
Journal box, one or two, replaced on same axle, solid pedestal truck	4	.96	4	.96
Journal boxes, three or four, replaced, same truck, solid pedestal truck	5	1.20	5	1.20
Journal box bolt, one or two, replaced, same box	1	.24	1	.24
Journals, truing up one or two, on same axle	2	.48	2	.48
Platform plank, one, replaced	1	.24	1	.24
Releasing rod for M. C. B. coupler, one, replaced.	½	.12	½	.12
Roof boards, single, including removing and replacing running board, per lineal foot		.07		.07
Roof boards, double board roof, including removing and replacing running board, per lineal foot		.09		.09
Running board, complete, applied	6	1.44	6	1.44
Spring plank, one, replaced	10	2.40	10	2.40
Side plank, one, renewed on gondola car—				
without angle irons	4	.96		
with angle irons, bolted	7	1.68		
with angle irons, riveted	8	1.92		
Side planks, two, renewed on same side—				
without angle irons	5½	1.32		
Side planks, two—				
with angle irons, bolted	8	1.92		
with angle irons, riveted	9	2.16		
Side planks, three, renewed on same side—				
without angle irons	7	1.68		
with angle irons, bolted	9	2.16		
with angle irons, riveted	10	2.40		
Side planks, four, renewed on same side—				
without angle irons	8½	2.04		
with angle irons, bolted	10	2.40		
with angle irons, riveted	11	2.64		
Side plate, one, applied	25	6.00	35	8 40
Side plate, one, spliced	8	1.92	15	3.60
Side post, one, replaced	3	.72	6	1.44
Siding, removed and replaced, per lineal foot		.15		.15
Siding, removed and replaced, where nails are set and holes puttied				.20
SILLS:				
1 center sill, spliced	16	3.84	20	4.80

	Ordinary Cars.		Refrigerator Cars.	
	Hrs.	Charge for Labor.	Hrs.	Charge for Labor.
2 center sills, spliced	22	$ 5.28	26	$ 6.24
1 center sill, replaced	35	8.40	47	11.28
2 center sills, replaced	41	9 84	68	16.32
1 end sill under siding, replaced	15	3.60	15	3.60
1 end sill outside siding, replaced	7	1.68	7	1.68
1 end sill under siding, replaced when one or more defective sills have been replaced	3	.72	3	.72
1 end sill under siding, renewed, when one or more defective sills have been spliced	10	2.40	10	2.40
1 end sill outside siding, replaced when one or more defective sills have been replaced	2	.48	2	.48
1 end sill, outside siding, renewed, when one or more defective sills have been spliced	3	.72	3	.72
1 intermediate sill, replaced	32	7.68	43	10.32
2 " sills, "	38	9.12	59	14.16
3 " " "	44	10.56	69	16.56
4 " " "	50	12.00	79	18.96
1 inter. sill and 1 center sill replaced	41	9.84	63	15.12
1 " " " 2 " sills "	47	11.28	84	20.16
2 " sills " 1 " sill "	46	11.04	73	17.52
2 " " " 2 " sills "	53	12.72	94	22.56
3 " " " 1 " sill "	51	12.24	83	19 92
3 " " " 2 " sills "	63	15.12	104	24.96
4 " " " 1 " sill "	63	15.12	93	22.32
4 " " " 2 " sills "	68	16.32	114	27.36
1 intermediate sill, spliced	11	2.64	14	3.36
1 side sill and 1 center sill replaced	51	12.24	68	16.32
1 " " " 2 " sills "	56	13.44	89	21.36
2 " sills " 1 " sill "	71	17.04	89	21.36
2 " " " 2 " sills "	74	17.76	110	26.40
1 " sill spliced	12	2.88	15	3 60
1 " sill replaced	25	6.00	44	10.56
2 " sills "	40	9.60	65	15.60
1 " sill and 1 inter. sill replaced	47	11.28	63	15.12
1 " " " 2 " sills "	53	12.72	73	17.52
1 " " " 3 " " "	59	14.16	83	19 92
1 " " " 4 " " "	65	15.60	93	22.32
2 " sills " 1 " sill "	61	14.64	84	20.16
2 " " " 2 " sills "	67	16.08	94	22.56
2 " " " 3 " " "	73	17.52	104	24.96
2 " " " 4 " " "	79	18 96	114	27.36
1 " 1 inter. and 1 center sill replaced	56	13.44	84	20.16
2 " 1 " " 1 " " "	77	18.48	105	25.20
1 " 2 " " 1 " " "	61	14 64	94	22.56
2 " 2 " " 1 " " "	79	18.96	115	27.60
1 " 3 " " 1 " " "	66	15.84	104	24.96
2 " 3 " " 1 " " "	84	20.16	125	30.00
1 " 4 " " 1 " " "	71	17.04	114	27.36
2 " 4 " " 1 " " "	89	21.36	135	32.40
1 " 1 " " 2 " sills "	61	14.64	105	25.20
2 " 1 " " 2 " " "	79	18.96	126	30.24
1 " 2 " " 2 " " "	66	15.84	115	27.60
1 " 3 " " 2 " " "	72	17.28	125	30.00
1 " 4 " " 2 " " "	77	18.48	135	32.40
2 " 2 " " 2 " " "	84	20.16	136	32.64
2 " 3 " " 2 " " "	89	21.36	146	35.04
2 " 4 " " 2 " " "	94	22.56	156	37.44
Each side or inter. sill spliced, when longitudinal sills have to be replaced, or when other sills are spliced at same end	3	.72	3	.72
1 center sill, spliced, when intermediate or side sills have to be replaced	8	1.92	9	2.16
1 center sill, spliced, when other center sill has to be replaced	6	1.44	7	1.68
Stakes, end, on gondola cars, applied, each	1½	.36	.....	....
Stakes, side, on gondola cars, applied, each	1½	.36	.....	....
Truck springs, one, or all in same truck, replacing	2	.48	2	.48
Truck transom, one, wood, replaced	10	2.40	10	2.40

	Ordinary Cars.		Refrigerator Cars.	
	Hrs.	Charge for Labor.	Hrs.	Charge for Labor.
Truck transoms, two, wood, replaced in same truck	12	$2.88	12	$2.88
Weighing and re-stenciling car, per Rule 72	1¼	.30	1¼	.30
When necessary to remove load to replace body center plate, bolt or bolts, one or two draft timbers, or draft timber bolts, at one end of car	3	.72	3	.72

REPAIRS OF STEEL CARS.

All rivets, 10 cents per rivet, which covers removal and replacing of rivets, including removing, fitting, punching or drilling holes when applying patches or splices and replacing damaged parts, not to include straightening or repairing.

Straightening or repairing parts removed from damaged car, 50 cents per 100 pounds.

Straightening or repairing parts in place in damaged car; also any parts that require straightening, repairing or renewing, not included on rivet basis, 24 cents per hour.

Credit for scrap material removed from cars constructed of pressed or structural steel, ½ cent per pound.

RULE 107. No charge to be made for labor of replacing or applying M. C. B. knuckles, knuckle pins, locking pins, clevises, clevis pins, lift chains, brake shoes or brake-shoe keys, except on the authority of a defect card.

No charge to be made for adjusting brakes.

RULE 108. When it is necessary to apply an M. C. B. coupler complete, on account of a broken or missing knuckle, the usual labor charge for replacing a coupler can be made.

RULE 109. No additional labor to be charged for applying center pins or friction rollers or for putting car on center, when center-plate bolts or center plates are renewed on same end of car.

RULE 110. No additional labor to be charged for renewing dead block or platform plank if end sill at same end is renewed or replaced.

RULE 111. No additional labor to be charged for replacing or renewing coupler when one or both draft timbers are replaced or renewed at the same end of car at the same time.

When one or more carrier iron bolts are replaced, where coupler at same end of car is removed and replaced for any other reason, the regular labor charge should be reduced one hour.

RULE 112. The following table shows the labor charges allowable for air-brake repair work. The letters "R. & R." mean "removed and replaced."

	Cents.
Air hose, R. & R.	3
Angle cock, R. & R.	7
Angle cock, handle, R. & R.	4
Angle cock, grinding in	28
Check valve case. spring, gasket, or all, R. & R.	10

DETAILS.	Cents.
Disconnecting union	3
Check valve case (two cap screws)	2
Emergency valve seat	5
Total	10

Coupler, dummy, R. & R. (1 lag screw)	1
Cut-out cock, R. & R.	9

DETAILS.	Cents.
1 union disconnected	3
2 pipe connections	6
Total	9

Cut-out cock handle, R. & R.	4
Cylinder, R. & R.	30

DETAILS.	Cents.
Push rod (1 connecting pin)	3
Clamping piston (1 cap screw)	2
Cylinder head, R. & R. (4 nuts ½ inch, 1 cent each)	4
Disconnecting cylinder from reservoir (7 nuts, ½ inch, 1 cent each)	7
Reclamping cylinder piston (1 cap screw)	2
Removing cylinder from car (6 nuts, ⅝ inch, 2 cents each)	12
Total	30

Cylinder and reservoir, R. & R.	41

DETAILS.	Cents.
Removing push rod (1 connecting pin)	3
Removing cylinder head (4 nuts, ½ inch, 1 cent each)	4
Removing cylinder from car (6 nuts, ⅝ inch, 2 cents each)	12
Removing reservoir from car (2 nuts, ⅝ inch, 2 cents each)	4
Removing release rods (2 spring cotters)	4
Removing release valve	2
Removing two plugs	2
Removing triple (2 nuts, ⅝ inch, 2 cents each)	4
Disconnecting train pipe union	3
Disconnecting retaining pipe unions	3
Total	41

	Cents.
Cylinder and reservoir, tightening when loose (8 nuts 1c each)	8
Cylinder cleaned, oiled, tested and stenciled	33

DETAILS.	Cents.
Removing push rod (1 connecting pin)	3
Clamping piston (1 cap screw)	2
Removing cylinder head (4 nuts, ½ inch, 1 cent each)	4
Cleaning, testing and stenciling	24
Total	33

Cylinder release spring, R. & R.	11

DETAILS.	Cents.
Removing push rod (1 connecting pin)	3
Clamping cylinder piston (1 cap screw)	2
Removing cylinder head (4 nuts, ½ inch, 1 cent each)	4
Reclamping cylinder head (1 cap screw)	2
Total	11

Cylinder gasket, R. & R.	25

DETAILS.	Cents.
Disconnecting triple union	3
Disconnecting retaining pipe union	3
Disconnecting reservoir block (2 nuts, ¾ inch, 2 cents each)	4
Disconnecting reservoir from cylinder (7 nuts, ½ inch, 1 cent each)	7
Removing push rod (1 connecting pin)	3
Clamping cylinder piston	1
Removing release rods (2 spring cotters)	4
Total	25

Emergency check valve, grinding in	10
Emergency valve piston, R. & R.	10

DETAILS.	Cents.
Disconnecting union	3
Removing check valve case (2 cap screws)	2
Removing emergency valve seat	5
Total	10

Emergency valve seat, R. & R. (see E. V. piston)	10
Emergency valve, rubber seat, R. & R.	10

DETAILS.	Cents.
Disconnecting union	3
Removing check valve case (2 cap screws)	2
Removing riveted pin	4
Removing emergency valve nut	1
Total	10

	Cents.
Cylinder piston packing, R. & R.	13

DETAILS.	Cents.
Removing push rod (1 connecting pin)	3
Clamping cylinder piston (1 cap screw)	2
Removing cylinder head (4 nuts, ½ inch, 1 cent each)	4
Removing leather packing (4 nuts, ½ inch, 1 cent each)	4
Total	13

Cylinder piston, R. & R.	15

DETAILS.	Cents.
Removing push rod (1 connecting pin)	3
Clamping cylinder piston (1 cap screw)	2
Removing cylinder head (4 nuts, ½ inch, 1 cent each)	4
Removing leather packing (4 nuts, ½ inch, 1 cent each)	4
Reclamping cylinder piston (1 cap screw)	2
Total	15

Gasket, coupling, R. & R.	2
Graduating nut, stem, spring or all, R. & R.	2
Oil plugs, R. & R. each	2
Packing leather expander, R. & R. (see cylinder piston)	7
Pipe, train or branch, R. & R., for each connection made	3
Push rod, R. & R. (1 connecting pin)	3
Release valve, R. & R.	6

DETAILS.	Cents.
Disconnecting release rod (2 spring cotters)	4
Disconnecting release valve	2
Total	6

Release valve, removed, repaired and replaced (R. & R. 4c)	9
Release valve rod, removed, repaired and replaced	3

DETAILS.	Cents.
1 spring cotter	2
Removing staple	1
Total	3

Reservoir, R. & R.	29

DETAILS.	Cents.
Removing from car (2 nuts, ⅝ inch, 2 cents each)	4
Disconnecting from cylinder (7 nuts, ½ inch, 1 cent each)	7
Removing release rods (2 spring cotters)	4
Removing release valve	2
Removing two plugs	2
Removing triple valve (2 nuts, ⅝ inch, 2 cents each)	4
Disconnecting union	3
Disconnecting union, retaining pipe	3
Total	29

Removing cylinder cap (3 nuts, ½ inch, 1c each)	3
Removing slide valve (3 nuts, ½ inch, 1c each)	3
Repairing retaining valve (R. & R. 5c)	10
Retaining valve, R. & R. (2 lag screws 2c, valve 3c)	5
Slide valve, removed, ground in and replaced	33
Slide valve spring, R. & R.	6

DETAILS.	Cents.
Cylinder cap (3 cap screws)	2
Removing riveted pin	4
Total	6

Strainer, R. & R. (disconnecting union)	3
Triple cylinder cap, R. & R. (3 nuts, ½ inch, 1c each)	3
Triple cylinder cap gasket, R. & R. (3 nuts, ½ inch, 1c each)	3
Triple piston packing ring, fitted	17
Triple valve, removed, cleaned, oiled, tested and stenciled	40

DETAILS.	Cents.
Train pipe union disconnected	3
Retaining pipe union disconnected	3
Removing triple (2 nuts, ⅝ inch, 2 cents each)	4
Check valve case (2 cap screws)	2
Emergency valve seat	5
Cylinder cap (3 bolts)	3
Cleaning, testing and stenciling	20
Total	40

	Cents.
Triple valve gasket, R. & R.	10

DETAILS.	Cents.
Disconnecting branch pipe union	3
Disconnecting retaining pipe union	3
Removing triple (2 nuts, ⅝ inch, 2 cents each)	4
Total	10

Unions disconnected and connected	3

The following basic units were used in determining the details of prices given above. These units are not to be used in rendering bills, but may be used in the determination of cost of other combinations of air brake repairs not above mentioned.

	Cents.
Cap screws or studs or bolts, R. & R., one or more	2
Cylinder cleaning, testing and stenciling	24
Emergency valve seat, R. & R	5
Graduating stem nut, R. & R	2
Lag or wood screws, R. & R., each	1
Nuts tightened when loose, each	1
Nuts, ½ inch or less, R. & R., 1 or 2 on same bolt	1
Nuts, ⅝ inch or over, R. & R., 1 or 2 on same bolt	2
Pins connecting R. & R. (including split key)	3
Pins riveted, R. & R., each	4
Plugs, oil, R. & R., each	1
Spring cotters, R. & R., each	2
Staples, R. & R., each	1
Testing air (after repairs)	5
Threads on pipe, cutting, per coupling	5
Train or branch pipe, disconnected and connected, or only connected, each connection	3
Triple valve, cleaning, testing and stenciling	20
Union disconnected and connected	3

RULE 113. The settlement prices of new eight-wheel cars shall be as follows, with an addition of $27.50 for each car equipped with 8-inch air-brake equipment and $35 for 10-inch air-brake equipment. The road destroying a car with air brakes may elect to return the air-brake apparatus, including such attachments as are usually furnished by the air-brake manufacturer, complete and in good condition:

BODIES.

Wood.

Box car, eight-wheel, 40 feet long or over	$440.00
Box car, eight-wheel, 36 feet long or over, but under 40 feet	385.00
Box car, eight-wheel, 34 feet long or over, but under 36 feet long	360.00
Box car, eight-wheel, 32 feet long or over, but under 34 feet long	330.00
Box car, eight-wheel, under 32 feet long	$265.00
Box car, ventilated, eight-wheel, 40 feet long or over	470.00
Box car, ventilated, eight-wheel, 36 feet long, but under 40 feet	415.00
Box car, ventilated, eight-wheel, 34 feet long, but under 36 feet	385.00
Flat car, eight-wheel, plain, 40 feet long or over	200.00

Flat car, eight-wheel, plain, 32 feet long or over, but under 40 feet	155.00
Flat car, eight-wheel, plain, under 32 feet long	110.00
Gondola car, eight-wheel, drop-bottom, 40 tons capacity or over	330.00
Gondola car, eight-wheel, drop-bottom, 30 tons capacity or over, but under 40 tons	300.00
Gondola car, eight-wheel, drop-bottom, 25 tons capacity or over, but under 30 tons	275.00
Gondola car, eight-wheel, drop-bottom, 20 tons capacity or under	200.00
Gondola car, eight-wheel, hopper-bottom, 50 tons capacity.	440.00
Gondola car, eight-wheel, hopper-bottom, 40 tons capacity or over, but under 50 tons	360.00
Gondola car, eight-wheel, hopper-bottom, 30 tons capacity or over, but under 40 tons	330.00
Gondola car, eight-wheel, hopper-bottom, 25 tons capacity or over, but under 30 tons	290.00
Gondola car, eight-wheel, hopper-bottom, 20 tons capacity or less	220.00
Gondola car, eight-wheel, plain, 50 tons capacity and over.	350.00
Gondola car, eight-wheel, plain, 40 tons capacity, but under 50 tons	300.00
Gondola car, eight-wheel, plain, 30 tons capacity, but under 40 tons	275.00
Gondola car, eight-wheel, plain, 25 tons capacity, but under 30 tons	250.00
Gondola car, eight-wheel, plain, under 25 tons	140.00
Stock car, eight-wheel, 34 feet long or over	330.00
Stock car, eight-wheel, 32 feet long or over, but under 34 feet	300.00
Stock car, eight-wheel, under 32 feet long	265.00

The lengths of cars above mentioned refer to the lengths over the end sills.

In the case of double-deck stock cars, $25 may be added to the prices given above for stock cars.

Where the capacity of the car is 60,000 pounds or over, 10 per cent should be added to the above prices for the car bodies.

When cars of 60,000 pounds capacity or over and so stenciled, have trucks with journals 4 inches or over in diameter when new, $40 per car shall be added to the figure as given above for the values of car bodies, when equipped with metal bolsters.

When cars are equipped with metal center sills, $40 shall be added to the values of bodies for cost of such metal sills.

Steel.

Box car, wooden body, metal underframe, eight-wheel, 50 tons capacity, 38 feet 6 inches or over, over end sills	$825.00
Box car, wooden body, metal underframe, eight-wheel, less than 50 tons capacity, 36 feet long or over	740.00
Flat car, wooden floor, metal underframe, eight-wheel, 50 tons capacity, 40 feet over end sills	770.00
Flat car, wooden floor, metal underframe, eight-wheel, 40 tons capacity, 40 feet over end sills	590.00
Flat car, wooden floor, metal underframe, eight-wheel, 40 tons or over, but under 50 tons, 34 feet long over end sills, but under 40 feet	510.00
Gondola car, all metal, eight-wheel, hopper bottom, 50 tons capacity, 33 feet over end sills	825.00
Gondola car, all metal, eight-wheel, drop bottom, 50 tons capacity, 40 feet over end sills	815.00
Gondola car, all metal, eight-wheel, plain, 50 tons capacity, 40 feet over end sills	790.00
Gondola car, wooden body, metal underframe, eight-wheel, flat bottom, 40 feet over end sills	790.00
Gondola car, wooden body, metal underframe, eight-wheel, hopper-bottom, 32 feet over end sills, but under 40 feet	650.00
Stock-car, eight-wheel, wooden body, metal underframe, less than 50 tons capacity, 36 feet long or over	715.00

TRUCKS.

50,000 lbs. capacity, with metal transoms and wooden bolster, per pair	$215.00
60,000 lbs. capacity or under, with wooden bolster, per pair	215.00
60,000 lbs. capacity, but under 80,000 lbs., all metal, per pair	315.00
80,000 lbs. capacity, but under 100,000 lbs., all metal, per pair	400.00
100,000 lbs. capacity or over, all metal, per pair	425.00

Prices include brake beams complete, truck levers, dead lever guides and bottom connection rods.

For trucks with steel or steel-tired wheels an additional allowance of $112 per car shall be made.

All trucks in service of 60,000 pounds capacity or over, which consist entirely of metal, with the exception of the spring plank, shall be known hereafter as all-metal trucks.

RULE 114. In the case of wooden car bodies the depreciation due to age shall be figured at 6 per cent per annum upon the yearly depreciated value of such car bodies.

In the case of all-steel car bodies the depreciation shall be figured at 5 per cent per annum.

In the case of car bodies with steel underframes the depreciation shall be figured at 5½ per cent per annum, with the exception of steel underframe flat cars having wooden floors, which shall be figured at 5 per cent per annum.

The depreciation on trucks other than all-metal, shall be figured at 6 per cent per annum.

The depreciation on all-metal trucks shall be figured at 5 per cent per annum.

Allowances for depreciation shall in no case exceed 60 per cent of the value new.

The amounts $27.50 and $35.00 for air brakes shall not be subject to any depreciation.

RULE 115. The bodies of refrigerator cars, stock cars permanently fitted for stall shipments, tank cars, except the tanks, and other freight cars, designed for special purposes, not referred to above, shall be settled for at the present cost price, as may be agreed to by the parties in interest, less the deduction for depreciation due to age, which shall be on the same basis as for regular freight equipment.

In the case of cars equipped with racks for carrying coke and for other such purposes, and also stock cars, other than those permanently fitted for stall shipments, with feeding and watering attachments, the actual cost of these equipments shall be added to the standard settlement price for such cars.

RULE 116. In rendering bills, cars shall be treated as belonging to companies or individuals whose name or initials they bear, except in case of Line Cars where the equipment list of the general officers of the Line designates a party to make settlement.

RULE 117. Switching roads will only be allowed to render bills against car owners for the following defects repaired by them: Roof lost on account of decay or faulty construction, worn-out brasses, broken truck springs, truck transoms, arch bars, draft-timber bolts, column bolts, truck hangers, truck transom truss rods, truck bolsters, truck bolster truss rods, oil boxes, spring planks, truck hanger pins, side bearings and center plates, center-plate bolts, center pins, followers, American continuous rods or keys, draft springs, couplers, knuckles and drawbar pockets and rivets, defective wheels as specified in Rules 7 to 18, inclusive, defective axles as described in Rules 22 and 23, worn-out parts of brakes as prescribed in Rule 30, cars not within the limits of standard height for couplers, as per Rule 39, safety appliances as prescribed by Rule 40, and grain doors and all inside or concealed parts of bodies of cars missing or damaged under fair usage as prescribed in Rule 38, provided the damage has not been caused by derailment or rough usage. They will be allowed to render bills direct against car owners on all car owners' defects on cars received by them from a railroad company, provided they procure joint evidence from the delivering road that such car owners' defect existed when the car was delivered by the railroad company, joint evidence to accompany the bill against the car owner.

RULE 118. A switching road is a corporation doing the major part of its business on a switching charge.

RULE 119. Bills may be rendered against car owners for the cost of applying temporary running boards and hand rails to make cars safe for trainmen.

DESTROYED CARS AND THE RETURN OF TRUCKS.

RULE 120. The company on whose line the bodies or trucks are destroyed shall report the fact to the owner immediately after their destruction, and shall have its option whether to rebuild or settle for the same.

RULE 121. If the company on whose lines the car is destroyed elects to rebuild either body or trucks, or both, the original plan of construction must be followed, and the original kind and qualities of materials used. The rebuilding must be completed within 60 days from the original date of damage or destruction. In such cases no allowance shall be made for betterments.

RULE 122. If only the body of a car is destroyed, and the company destroying it elects to return the trucks, they shall be put in good order, or accompanied by a defect card, covering all defects or improper repairs made by them for which owners are not responsible, and forwarded, within 60 days, free of freight or other charges, to the nearest point on the line of the company owning or operating the car, and the number, line and class of car destroyed shall be stenciled or painted on each truck so returned.

RULE 123. The company on whose line the body or trucks of a car are seriously damaged, but not destroyed, may notify the owner and ask an appraisement on the damage done to the car as a basis for the disposal of the damaged car.

Rule 124. For the mutual advantage of railway companies interested, the settlement for a car owned or controlled by a railway company, when damaged or destroyed upon a private track, shall be assumed by the railway company delivering the car upon such tracks.

SENDING HOME WORN-OUT AND DAMAGED CARS.

Rule 125. A car unsafe to load on account of general worn-out condition, due to age or decay, shall be reported to its owner, who must be advised of all existing defects. If the owner elects to have it sent home, he shall furnish two home cards, noting upon them existing defects and the route over which the car is to be returned to its owner. If the route coincides with that over which the car passed to the point where it became unserviceable, no liability shall be incurred as between the owner and the road handling the car, either for freight charges in handling the car or for car service during this movement.

Such cards shall be attached to each side of the body of the car. They shall be 3½ by 8 inches, and of the form shown below. They shall be printed on both sides, and shall be filled in on both sides with ink or black indelible pencil:

FROM

.... R. R.

TO

.... R. R.

VIA

....

....

Car No ....Initials ....

To be shopped for ....

....

....

....

(Head of Car Department.)

Rule 126. A car which is safe to run, but unsafe to load on account of serious damage caused by wreck or accident, shall be reported to the owners for appraisement and disposition, and disposed of as provided in Rule 125, if the owner so elects.

Rule 127. In case of cars of private ownership sent home on account of general worn-out condition due to age or decay, such cars shall be entitled to as many miles of homeward movement, free of charge to owners, as they may have been handled over said line under load, and no mileage to be paid to owners by roads handling. If the haul necessary to get cars home is in excess of such loaded mileage, said excess will be billed against the owner at regular freight rates and the owner notified.

RULE 128. Private line cars sent home to owners on account of being wrecked or damaged in accident shall be regularly billed home free of charge to owners and owners notified, providing such homeward movement passes over roads which have handled the cars loaded, previous to their homeward empty movement; otherwise the damaged cars to travel home empty, free of charges and free of mileage according to home route; or, if owners prefer to have them billed home via direct line, then charges to accrue to such line over which cars were not entitled to free movement.

FURNISHING MATERIALS.

RULE 129. Companies shall promptly furnish to each other, upon requisition, and forward free over their own road, material for repairs of their cars damaged upon foreign lines, excepting that the company having car in its possession at the time shall provide from its own stock the following:

Lumber, forgings, hardware stock, paint, hairfelt, piping, air-brake material and all M. C. B. standard material.

Requisitions for such material shall specify that same is for repairs of cars, giving car number and initial of such car, together with pattern number or other data to enable correct filling of requisition.

CONDITIONS OF ACCEPTANCE OF THIS CODE.

RULE 130. Any car owner or railway company may become a party to this Code of Rules by giving notice through one of its general officers to the Secretary of the Master Car Builders' Association.

Railroad companies becoming subscribers to this Code of Rules must have a representative member in the Master Car Builders' Association.

RULE 131. Any car owner or railway company that is a party to this Code of Rules shall be bound by same through its successive revisions, until one of its general officers files with the Secretary of the Master Car Builders' Association its notification of withdrawal.

RULE 132. Acceptance or rejection of this Code of Rules must be as a whole, and no exception to an individual rule or rules shall be valid.

SETTLEMENT OF DISPUTES.

RULE 133. In order to settle disputes arising under the rules, and to facilitate the revision of the rules at the annual conventions of the Association, an Arbitration Committee of five representative members shall be appointed annually by the Executive Committee; three members of this committee to constitute a quorum.

In case of any dispute or question arising under the rules between the subscribers to said rules, the same may be submitted to this committee through the secretary, in abstract, jointly, said abstract setting forth the point or points at issue, and each party's interpretation of the rules upon which its claim is based, clearly and concisely, not exceeding three type-written pages of letter size, single space, which shall be signed by both parties to the dispute. Should one of the parties refuse or fail to furnish the necessary information, the committee shall use its judgment as to whether, with the information furnished, it can properly give its opinion. The decisions of the committee shall be final and binding upon the parties concerned. This committee shall report its decisions to the Association, and its report shall be incorporated in the annual report of proceedings of the Association.

REVISION OF THIS CODE OF RULES.

RULE 134. The Arbitration Committee shall ask for suggestions of changes, amendments and additions to these rules prior to each annual convention, which it shall consider, and it shall report its recommendations to the succeeding annual convention.

RULE 135. In the revision of these rules by the Association, a two-thirds vote shall be necessary for adoption.

RULE 136. Voting powers shall be the same as prescribed in the Constitution of the Master Car Builders' Association on matters pertaining to the adoption of standards and the expenditure of money.

RULE 137. This Code of Rules shall be introduced for discussion and revision at one session of the Master Car Builders' Association convention each year.

RULE 138. This Code of Rules shall take effect September 1, 1908.

LIST OF CAR OWNERS AND RAILWAY COMPANIES

WHICH HAVE ADOPTED THE CODE OF RULES GOVERNING THE CONDITION OF, AND REPAIRS TO, FREIGHT CARS FOR THE INTERCHANGE OF TRAFFIC.

The following is a complete list of car owners and railway companies which have given notice of the adoption of the above Code of Rules.

Other companies which adopt this Code of Rules should notify the secretary, in accordance with the Rules, so that the names of such companies may be included in the list thereafter. Notice should be given of all changes in the names of companies in this list.

Alabama Great Southern.
Alabama & Mississippi.
Alabama & Vicksburg.
Alameda & San Joaquin.
Albany & Hudson.
Algoma Central.
Aliquippa & Southern.
Allegheny Valley.
American Cotton Oil Co.
American Fast Freight Line.
American Refrigerator Transit Co.
American Tank Line.
Ann Arbor.
Arkansas Central.
Arkansas, Louisiana & Gulf.
Arkansas, Louisiana & Southern.
Armour Car Lines.
Armour Packing Co.
Arms Palace Horse Car Co.
Astoria & Columbia River.
Atchison, Topeka & Santa Fe.
Atlanta, Knoxville & Northern.
Atlanta Stone, Coal & Lumber Line.
Atlantic & Birmingham.
Atlantic & Pacific.
Atlanta & West Point.
Atlantic Coast Line.
Atlantic Seaboard Line.
Atlantic, Valdosta & Western.
Baltimore & Lehigh.
Baltimore & Ohio.
Baltimore & Ohio Southwestern.
Baltimore & Potomac.
Bangor & Aroostook.
Barberton Belt.
Barrett Mfg. Co.
Bay Terminal.
Beech Creek.
Bellefonte Central.
Bellingham Bay & British Columbia.
Bennington & Rutland.
Bessemer & Lake Erie.
Bessemer Coke Co.
Birmingham Southern.
Booth's Cold Storage System.
Booth's Refrigerator Line.
Boston & Albany.
Boston & Lowell.
Boston & Maine.
Boston, Hoosac Tunnel & Western.
Brimstone Railroad & Canal Co.
Bristol, Elizabethton & North Carolina.
Buffalo, Rochester & Pittsburg.
Buffalo & Susquehanna.
Burlington, Cedar Rapids & Northern.
Burlington & Missouri River in Nebraska.
Butte, Anaconda & Pacific.
Cairo, Vincennes & Chicago.
California Fruit Transportation Co.
Cammal & Black Forest.
Canada Atlantic.

Canada Southern.
Canadian Northern.
Canadian Pacific.
Canadian Northern Quebec.
Cananea Consolidated Copper Co.
Cananea, Yaqui River and Pacific.
Canda Cattle Car Co.
Carolina Central.
Carolina & North-Western.
Cape Girardeau South-Western.
Central Indiana.
Central New England.
Central R. R. & Banking Co. of Georgia.
Central Railroad of New Jersey.
Central Vermont.
Champaign & Havana.
Chattanooga, Rome & Columbus.
Chattanooga Southern.
Chesapeake, Ohio & South-Western.
Chesapeake & Ohio.
Chesapeake & Western.
Chicago, Burlington & Kansas City.
Chicago, Burlington & Northern.
Chicago, Burlington & Quincy.
Chicago, Cincinnati & Louisville.
Chicago, Fort Madison & Des Moines.
Chicago Great Western.
Chicago, Indianapolis & Louisville.
Chicago Junction.
Chicago, Kalamazoo & Saginaw.
Chicago, Lake Shore & Eastern.
Chicago, Milwaukee & St. Paul.
Chicago, New York & Boston Refrigerator Co.
Chicago, Peoria & St. Louis.
Chicago Refrigerator Car Co.
Chicago, Rock Island & Pacific.
Chicago, St. Louis & Pittsburgh.
Chicago, St. Paul, Minneapolis & Omaha.
Chicago Terminal Transfer.
Chicago Union Transfer.
Chicago & Alton.
Chicago & Eastern Illinois.
Chicago & Erie.
Chicago & Iowa.
Chicago & Milwaukee Electric.
Chicago & North-Western.
Chicago & South Bend.
Chicago & Western Indiana and Belt Railway.
Chihuahua & Pacific.
Choctaw, Oklahoma & Gulf.
Cincinnati, Hamilton & Dayton.
Cincinnati, Selma & Mobile.
Cincinnati Northern.
Cincinnati Southern.
Cincinnati, New Orleans & Texas Pacific.
Cleveland, Akron & Columbus.
Cleveland, Cincinnati, Chicago & St. Louis.
Cleveland & Marietta.
Cleveland, Canton & Southern.
Cleveland, Lorain & Wheeling.
Cleveland Terminal & Valley.
Clove Branch.
Coal & Coke.
Cold Blast Transportation Co.
Colorado & Southern.
Colorado and South-Eastern.
Colorado & Wyoming.
Colorado Midland.
Colorado Springs & Cripple Creek District.
Columbia & Puget Sound.
Columbus, Hocking Valley & Toledo.
Connecticut River.
Consolidated Cattle Car Co.
Consolidated Rolling Stock Co.
Continental Fruit Express.
Cornwall.
Cornwall & Lebanon.
Corsicana Cotton Oil Co.
Corvallis & Eastern.
Craig Oil Co.
Crystal Car Line.
Cudahy Refrigerator Line.
Cumberland Valley.
Cumberland & Pennsylvania.

Dairy Shippers' Despatch.
Delaware, Lackawanna & Western.
Delaware River & Union.
Delaware, Susquehanna & Schuylkill.
Delaware & Hudson Co.
Delray Connecting.
Denver & Rio Grande.
Detroit, Toledo & Milwaukee.
Detroit & Lima Northern.
Detroit & Mackinac.
Des Moines & Fort Dodge.
Des Moines & Northern.
Dolese & Shepard.
Dominion Atlantic.
Doud Stock Car Co.
Dry Fork.
Duluth & Iron Range.
Duluth, Missabe & Northern.
Duluth, South Shore & Atlantic.
Durham & Northern.
Eagle Oil Co.
East & West.
Elgin, Joliet & Eastern.
Elizabeth River.
Elmira, Cortland & Northern.
El Paso & Southwestern.
Empire Oil Works.
Erie.
Erie & Michigan Ry. & Nav. Co.
Erie & Wyoming Valley.
Esquimalt & Nanaimo.
Evansville & Terre Haute.
Express Coal Line.
Fairbank Co., The N. K.
Fall Brook.
Findlay, Fort Wayne & Western.
Fitchburg.
Florence & Cripple Creek.
Florida Central & Peninsular.
Florida Central.
Florida East Coast.
Fort Smith & Western.
Fort Worth Belt.
Fort Worth & Denver City.
Freedom Oil Works.
Galveston, Harrisburg & San Antonio.
Geneva, Ithaca & Sayre.
George's Creek & Cumberland.
Georgia.
Georgia, Carolina & Northern.
Georgia Southern & Florida.
German-American Car Co.
German-American Refrigerator Express.
German-American Tank Line.
Gila Valley, Globe & Northern.
Golden Circle.
Goodwin Car Co.
Grand Rapids & Indiana.
Grand Trunk Ry. System.
Great Northern Railway Line.
Great Western Oil Refrigerating Co.
Green Bay & Western.
Gulf, Colorado & Santa Fe.
Gulf, Western Texas & Pacific.
Guiton, W. A., & Co.
Hannibal & St. Joseph.
Hartford & Connecticut Western.
Hecla Belt Line.
Heinz, H. J., & Co.
Higgins Oil & Fuel Co.
Higley Co. Refrigerator Line.
Housatonic.
Houston East & West Texas.
Houston & Texas Central.
Huntington & Broad Top Mountain.
Hutchinson & Southern.
Illinois Central.
Illinois, Iowa & Minnesota.
Illinois Southern.
Imperial Oil Co., Ltd.
Indiana, Bloomington & Western.
Indianapolis, Decatur & Western.
Indiana Harbor.
Indiana, Illinois & Iowa.
Indiana Pipe Line & Refining Co.
Intercolonial of Canada.
International & Great Northern.
Interstate.
Iowa Central.
Iron Car Express Coal Line.
Jacksonville & St. Louis.
Jacob Dold Packing Co.
Jamison Coal & Coke Co.

Kanawha & Michigan.
Kansas City, Fort Scott & Memphis
Kansas City, St. Joseph & Council Bluffs.
Kansas City, Memphis & Birmingham.
Kansas City, Mexico & Orient.
Kansas City Southern.
Kentucky Refining Co.
Keokuk & Western.
Keystone Palace Horse Car Co.
Kilpatrick Bros. & Collins Contracting Co.
Knapp, I. N.
Lackawanna Coal & Coke Co.
Lackawanna Iron & Steel Co.
Lackawanna Steel Co.
Lake Carrier's Oil Co.
Lake Champlain & Moriah.
Lake Erie & Detroit River.
Lake Erie & Western.
Lake Shore & Michigan Southern.
Lake Superior & Ishpeming.
Lake Terminal.
Leavenworth, Kansas & Western.
Leetonia.
Lehigh & Hudson River.
Lehigh & New England.
Lehigh Valley.
Lexington & Eastern.
Litchfield & Madison.
Litchfield, Carrollton & Western.
Live Poultry Transportation Co.
Louisiana & Arkansas.
Louisiana & Northwest.
Louisiana Railway & Navigation Co.
Louisiana Western.
Louisville Cotton Oil Co.
Louisville & Nashville.
Louisville, New Orleans & Texas.
Louisville Soap Co.
Louisville, St. Louis & Texas.
Louisville & St. Louis.
Lutz & Schramm Co.
McCloud River.
Macon & Birmingham.
Madison, Alton & Chicago.
Mahoning Valley.
Maine Central.
Manhattan Oil Co.
Manistee & Grand Rapids.
Manistee & North Eastern.
Manitoba & North-Western Ry. of Canada.
Manufacturers' Junction.
Maricopa & Phœnix & Salt River Valley.
Marietta, Columbus & Cleveland.
Marquette & Southeastern.
Martin. John C.
Marshalltown & Dakota.
Mason City & Fort Dodge.
Mather Stock Car Co.
Mercer Valley.
Mexican Central.
Mexican International.
Mexican Northern.
Michigan Ammonia Works.
Michigan Central.
Midland Terminal.
Midland Valley.
Miller Sons' Co., A. D.
Milwaukee, Lake Shore & Western.
Mineral Point Zinc Co.
Minneapolis, St. Paul & Sault Ste. Marie.
Minneapolis & St. Louis.
Minnesota & International.
Mississippi Central.
Mississippi River & Bonne Terre.
Mississippi River, Hamburg & Western.
Missouri Pacific.
Missouri & North Arkansas.
Missouri, Kansas & Texas.
Mobile & Birmingham.
Mobile & Ohio.
Mobile, Jackson & Kansas City.
Monongahela Connecting.
Monongahela River Consol. Coal & Coke Co.
Montana Union.
Monte Cristo.
Mooney Car Line Co.

Morgan's Louisiana & Texas Railroad & Steamship Co.
Morganstown & Kingwood.
Morrisey, Fernie & Michel.
Morton-Gregson Car Lines.
Munising.
Nacozari.
Nashville, Chattanooga & St. Louis.
National Ammonia Co.
National Car Co.
National Car Line.
National Rolling Stock Co.
Nelson Morris & Co.
Newburgh, Dutchess & Connecticut.
New Orleans & North-Eastern.
Newport News & Mississippi Valley.
New York Central & Hudson River.
New York & Northern.
New York & Ottawa.
New York, Chicago & St. Louis.
New York, New Haven & Hartford
New York, Ontario & Western.
New York, Pennsylvania & Ohio.
New York, Philadelphia & Norfolk.
New York, Providence & Boston.
New York & New England.
New York, Susquehanna & Western.
New York, Texas & Mexican.
Norfolk Southern.
Norfolk & Carolina.
Norfolk & Portsmouth Belt Line.
Norfolk & Western.
Northern Central.
Northern Pacific.
Old Colony.
Ohio Southern.
Ohio & Mississippi.
Ogdensburg & Lake Champlain.
Omaha & St. Louis.
Oregon Electric.
Oregon Railroad & Navigation Co.
Oregon Short Line.
Overland Refrigerator Express.
Paragon Refining Co.
Parral & Durango.
Penn Gas Coal Co.
Pennsylvania Coal & Coke Co.
Pennsylvania Co.
Pennsylvania Railroad.
Pennsylvania, Poughkeepsie & Boston.
Pennsylvania & North-Western.
Peoria, Decatur & Evansville.
Pere Marquette.
Petersburg.
Philadelphia & Reading.
Philadelphia, Wilmington & Baltimore.
Pittsburgh, Akron & Western.
Pittsburgh, Chartiers & Youghiogheny.
Pittsburgh, Cincinnati, Chicago & St. Louis.
Pittsburgh Coal Co.
Pittsburg, Shawmut & Northern.
Pittsburg Provision & Packing Co.
Pittsburgh & Buffalo Co.
Pittsburgh & Eastern.
Pittsburgh & Lake Erie.
Pittsburgh & Western.
Plant System.
Pontiac, Oxford & Northern.
Portland & Rumford Falls.
Produce Shippers' Despatch.
Producer's Pipe Line Co.
Providence & Worcester.
Provision Dealers' Despatch.
Quebec & Lake St. John.
Quebec, Montreal & Southern.
Raleigh & Augusta Air Line.
Raleigh & Gaston.
Rio Grande, Sierra Madre & Pacific.
Richmond, Fredericksburg & Potomac.
Rio Grande Western.
Rock Island & Peoria.
Rome, Watertown & Ogdensburg.
Roanoke & Tar River.
Rutland.
Saginaw Valley & St. Louis.
Saint Clair Terminal.

San Antonio & Aransas Pass.
San Pedro, Los Angeles & Salt Lake.
Santa Fe Central.
Santa Fe Pacific.
Santa Fe, Prescott & Phœnix.
Santa Fe Refrigerator Despatch.
Scioto Valley.
Seaboard & Roanoke.
Seattle & International.
Shenandoah Valley.
Sherman, Shreveport & Southern.
Shippers Refrigerator Car Co.
Sierra Ry. Co. of California.
South Buffalo.
South Carolina.
South-Eastern Line.
South Florida.
Southwestern of Arizona.
Southern.
Southern Central.
Southern Freight Line.
Southern Indiana.
Southern Iron Car Line.
Southern Oil Co.
Southern Pacific (Pacific System).
Spokane & Inland Empire.
Spokane Falls & Northern.
Spokane International.
Spokane, Portland & Seattle.
St. Joseph, South Bend & Southern.
St. Joseph & Grand Island.
St. Louis, Brownsville & Mexico.
St. Louis Car Co. Line.
St. Louis, Chicago & St. Paul.
St. Louis Dressed Beef & Provision Co.
St. Louis, Kansas City & Colorado.
St. Louis, Keokuk & North-Western.
St. Louis, Peoria & Northern.
St. Louis Refrigerator Car Co.
St. Louis, Rocky Mountain & Pacific.
St. Louis South-Western.
St. Louis South-Western Railway of Texas.
St. Louis Transfer.
St. Louis, Troy & Eastern.
St. Louis & Hannibal.
St. Louis & O'Fallon.
St. Louis & San Francisco.
St. Paul & Duluth.
Staten Island Rapid Transit.
Street's Western Stable Car Line.
Susquehanna & New York.
Swift & Co.
Swift Refrigerator Transportation Co.
Swift Live Stock Express Line.
Sydney & Louisburg.
Takoma Eastern.
Tehuantepec National.
Temiskaming & Northern Ontario.
Tennessee Copper Co.
Texas & New Orleans.
Texas Brewing Co.
Texas Central.
Texas Company.
Texas Pacific.
Tionesta Valley.
Toledo, Cincinnati & St. Louis.
Toledo, Columbus & Cincinnati.
Toledo, Peoria & Western.
Toledo, St. Louis & Western.
Toledo Terminal.
Toledo & Ohio Central.
Toledo & Ohio Central Extension
Toledo & Western.
Tonopah & Goldfield.
Tonopah & Tidewater.
Toronto, Gray & Bruce.
Toronto, Hamilton & Buffalo.
Tremont & Gulf.
Trinity & Brazos Valley.
Troy & Boston.
Tyler South-Eastern.
Union.
Union Pacific.
Union Refrigerator Transit Co.
Union Stock Yards & Transit Co. of Chicago.
Union Stock Yards Co. of Omaha.
Union Tank Line.

United Coal Co.
Vandalia.
Vera Cruz & Pacific.
Vicksburg, Shreveport & Pacific.
Vinton Colliery Co.
Virginia.
Virginia & Southwestern.
Wabash Railway.
Walworth & Neville Mfg. Co.
Washington Coal & Coke Co.
Washington Southern.
Waters Pierce Oil Co.
Wheeling & Lake Erie.
Western Car Co.
Western Live Stock Express.
Western Maryland.
Western Railway of Alabama.
Western New York & Pennsylvania.
Western Rolling Stock & Equipment Co.
West Jersey & Seashore.
West Shore.
West Side Belt.
West Virginia Central & Pittsburg
Williamsville, Greenville & St. Louis.
Wilmington & Northern.
Wisconsin Central.
Wisconsin & Northern.
Yellowstone Park.
Zanesville & Ohio River.
Zanesville & Western.

APPENDIX.

CODE OF RULES

Governing the Condition of, and Repairs to, Passenger Equipment Cars in Interchange.

PREFACE.

These rules make car owners responsible for, and therefore chargeable with, the repairs to their cars necessitated by ordinary wear and tear in fair service, so that defect cards will not be required for any defects thus arising.

Railroad companies handling cars are responsible for damage done to any car by unfair usage, derailment or accident, and for improper repairs made by them, and they should make proper repairs at their own expense, or issue defect card covering all such damage or improper repairs.

All inspection of passenger cars for interchange will be made in accordance with the following rules.

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1. Each railway company shall give to foreign cars, while on its line, THE SAME CARE AS TO OILING, PACKING AND INSPECTION THAT IT GIVES ITS OWN CARS, except in case of cars on which work is done under special agreement existing between the company owning the cars and the Road operating the same.

2. The expenses of maintenance of passenger equipment operated in interchange or line service, shall be divided into three classes, namely:

(a) Owner's defects.

(b) Delivering company's defects.

(c) Line expenses proratable against the roads comprising the lines on a mileage basis.

3. (a) Owner's defects are those due to ordinary wear and tear.

(b) Delivering company's defects are those due to unfair usage, derailment or accident. Delivering company is solely responsible to car owners for any improper repairs made by them.

(c) Line expenses shall consist of the expense of terminal cleaning, lubrication (oil, waste, tallow and labor), lighting (oil, wicks, chimneys, burners, shades, gas, candles and broken glass).

4. The railway making the repairs for the defects not proratable against the line is privileged to bill the car owner for these repairs, unless there is evidence to indicate that the damage was occasioned by unfair handling on the part of the delivering company.

5. Information as to mileage made by cars must be furnished promptly on request of owners by railways over which cars are run.

6. Only one journal bearing per journal may be charged per trip.

7. No labor charge shall be made for applying brake shoes, journal bearings, hose (air, steam or signal) or for icing, filling lamps, gassing tanks or coaling cars.

8. No credit to be allowed for scrap brake shoes removed.

NOTE.—Steel back brake shoes not to be removed if over one-half (½) inch thick; grey iron shoes not to be removed if over three-quarter (¾) inch thick.

9. Loss of metal from tires of steel-tired wheels, caused by flat sliding, is chargeable to the company on whose road the damage occurs.

NOTE.—Loss of service metal from steel-tired wheels as a result of sliding to be measured from point where slide begins. One-sixteenth (1-16) inch of metal to be allowed for flat spots under two and one-half (2½) inches long and one-eighth (⅛) inch of metal to be allowed for flat spots two and one-half (2½) to three and one-half (3½) inches in length, both inclusive.

10. (a) Axles broken under fair usage or having journals one-half (½) inch or more under the standard for car (except for three and three-quarters by seven (3¾ by 7) which will be condemned at three and one-half (3½) inches) may be renewed at the expense of the car owner. Size of journal should be stenciled on truck.

(b) Cut journals, axles bent or broken or rendered unsafe by unfair usage, derailment or accident, shall be renewed at the expense of the railway on whose line the damage occurs.

(c) Where necessary to true up axles in cases of cut journals, where the journal is reduced below the limit as prescribed in Rule 10-a, axle must be changed at the expense of company cutting journal.

Charge for car heating to be 15 cents per day per car.

11. Cars lying at stations for over forty-eight hours, expense of heating to be borne by railway in whose possession cars may be.

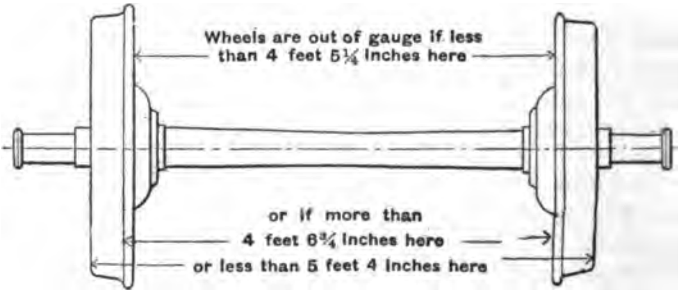
12. (a) Brakes must be in perfect working order. Cylinders and triple valves must have been cleaned and oiled within six (6) months, and in case of cars equipped with high speed brakes, triple and high-speed valves must be cleaned every three (3) months and date of last cleaning and oiling stenciled on brake cylinder and triple valve with white paint.

(b) The adjustment of piston travel based on not less than seventy (70) pounds initial pressure must not be less than five (5) inches nor more than eight (8) inches.

Defects in Wheels — Owners Responsible.

13. (a) Loose wheels.

(b) Variation from gauge if less than 4 feet 5¼ inches inside of wheel at flange, or, if more than 4 feet 6¾ inches outside of flange or less than 5 feet 4 inches outside of tread.


Wheels are out of gauge if less than 4 feet 5¼ inches here
or if more than 4 feet 6¾ inches here
or less than 5 feet 4 inches here

Wheels — Cast-iron.

14. (a) Shelled out; wheels with defective treads on account of pieces shelling out; if the spots are over one (1) inch or so numerous as to endanger the safety of the wheel.

(b) Tread worn hollow; if tread is worn hollow ⅛ inch or over.

(c) Worn flanges; flanges having flat vertical surfaces extending more than ¾ inch from tread, or, flanges less than 1⅛ inches thick.

(d) Burst; if wheel is cracked from wheel fit outward by pressure from axle.

(e) Flange, rim, tread, plate brackets or any other part of wheel, either cracked, chipped or broken under fair usage.

Wheels — Steel-tired.

15. (a) Loose, broken or cracked hubs, plates, bolts, retaining ring or tire, occurring under fair usage.

(b) Worn flange or tire; with flange less than 1⅛ inches thick or having flat vertical spot extending more than ¾ inch from tread, or with tire thinner than shown in Figs. 1, 2, 3, 4, 5 and 6.

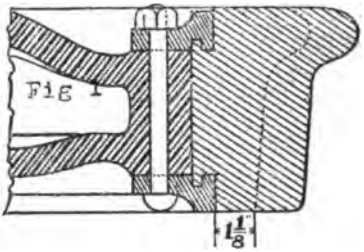


Fig 1

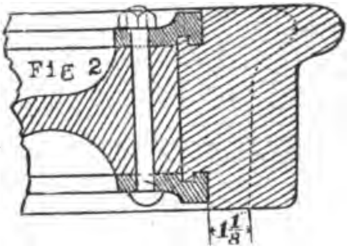


Fig 2

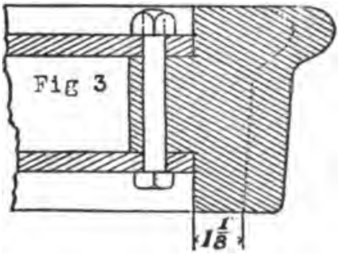


Fig 3

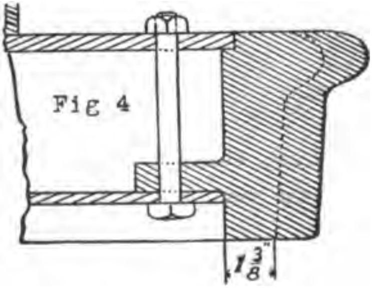
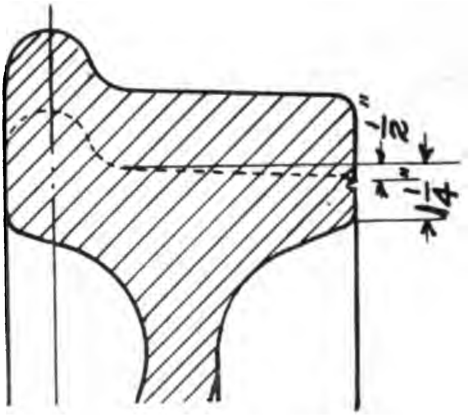


Fig 4



ROLLED STEEL WHEEL

FIG. 5.

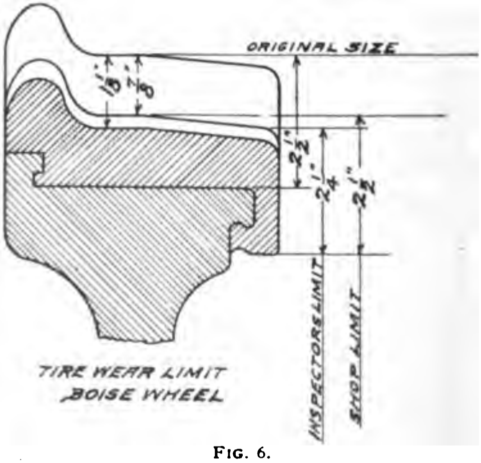


FIG. 6.

DELIVERING COMPANY RESPONSIBLE.

16. Flat spots; if flat spots, caused by sliding, exceed one inch in length.

17. (a) If a car is transferred from the service of one railroad to that of another, the receiving road shall issue gas certificate authorizing

(Name of Road.)

GAS CERTIFICATE.

....
Car Number ....Initial ....
Number of Atmospheres ....
Number of Holders ....
Size of Holders ....
.... Station, ...190
.........................Inspector.

the delivering road to bill against it for the number of atmospheres of gas and number of holders at the time car was received.

(b) Cars in interchange requiring holders to be filled, the receiving road shall be charged for the quantity of gas supplied.

(c) For cars stored in shops for repairs the company having car in its possession shall be responsible to the delivering company for the gas in holders. This will apply to sleeping-car companies when cars are in their possession and out of service.

(d) Private or other cars, except regular line cars, when offered in interchange equipped with steam hose couplings that will not couple with the standard on the receiving line must be changed by receiving company; the hose removed to accompany car or be returned to delivering company.

18. The depreciation of all passenger equipment cars due to age shall be figured at 3 per cent per annum upon the yearly depreciated value of same, to continue not to exceed 50 per cent of its original value. The above method of depreciation applies equally to either bodies or trucks of such cars. No depreciation shall be allowed on the value of air brakes.

19. This code of rules is to apply to all equipment interchanged in passenger trains.

20. Bills for line charges shall be made and rendered monthly and prices for materials and labor shall be in accordance with accompanying schedule.

21. Air-brake hose applied subsequent to September 1, 1906, must be made in accordance with M. C. B. specifications and so labeled.

22. This Code of Rules shall take effect September 1, 1908.

LIST OF PRICES FOR MAINTENANCE OF PASSENGER EQUIPMENT IN INTERCHANGE.

		New.	S. H.	Scrap.
1	Axles, 5 by 9 inches	$17.75	$10.00	$6.50
	Axles, 4¼ by 8 inches	14.00	7.75	5.25
	Axles, 3¾ by 7 inches	11.50	6.25	4.25
2	Burners, round wick, each			.50
3	Burners, dual wicks, each			.30
4	Bell or signal cord and couplings, per car			.75
5	Bearings, journal, applied, per lb.			.20
6	Bearings, journal, credit for scrap bearing one-half weight of new bearing, per lb.			.15

7	Bolts, nuts and forgings, per lb.	$0 03
8	Bolts, nuts and forgings, credit, per lb.	.00¼
9	Bowls, opal, gas, 9-inch, each	.50
10	Chimneys, round wick, each	.11
11	Chimneys, dual wick, each	.06
12	Candles, per lb.	.15
13	Coal (including labor), per ton	6.00
14	Chain, per lb.	.05
15	Chain, credit, per lb.	.01
16	Cleaning parlor and sleeping cars, exclusive of bedding, per car	1.35
17	Cleaning vestibuled passenger and combination cars, each	.85
18	Cleaning common passenger and combination cars, each	.50
19	Cleaning vestibuled baggage and mail cars, each	.50
20	Cleaning common baggage and mail cars, each	.30
21	Taking out carpets, seats, draperies, etc., from parlor and sleeping cars and beating them, per car	1.00
22	Taking out and beating cushions and backs of seats of passenger cars, either vestibuled or common, per car	.65
	(No additional charge for cleaning trucks of parlor or sleeping cars.)	
23	Domes, gas, each	.50
24	Diamond S. brake shoes, applied, each, no credit for scrap	.50
25	Gas, Pintsch, per receiver	.85
26	Globes, gas, 4-inch, each	.50
27	Globes, opal gas, each	.50
28	Glass, per light	At Cost.
29	Glass, setting, per light	.25
30	Hose, air-brake or signal, complete with fittings, applied to car, each:	
	1-inch air signal	1.75
	1¼-inch air-brake	2.00
31	Hose, air-brake or signal, credit for fittings	.80
32	Hose, 1½-inch straight port, steam, complete with fittings, applied to car.	6.50
	1-inch	5.00
33	Hose, 1½-inch steam, credit for fittings	5.25
	1-inch	4.00
34	Ice (including labor), per cwt.	.30
35	Iron, cast, per lb.	.02
36	Iron, cast, credit, per lb.	.006-10
37	Iron, malleable, per lb.	.03½
38	Iron, malleable, credit, per lb	.00½
39	Labor, on lubrication, per hour	.24
40	Labor, on repairs, per hour	.30
41	Lumber, oak, pine, hickory, poplar and elm, per ft	.03½
42	Oil, Galena, car, per gal.	.22
43	Oil, Galena, coach, per gal.	.35
44	Oil, illuminating, American roads to charge, per gal.	.11
45	Oil, illuminating, Canadian roads to charge, per gal.	.16
46	Shades, acme lamp, each	.45
47	Shades, common lamp, each	.25
48	Steel, spring (not springs), per lb.	.05
49	Steel, spring, credit, per lb.	.00¼
50	Steel castings, per lb.	.04½
51	Steel castings, credit, per lb.	.00¼
52	Tallow, per lb.	.06
53	Waste, woolen, per lb.	12½
54	Waste, cotton, per lb.	.06
55	Wicks, round, each	.02
56	Wicks, dual, each	.00½

		New.	S. H.	Scrap.
57	Wheels, cast, 36-inch	$10.50	$7.75	$5.25
58	Wheels, cast, 33-inch	9.00	7.00	4.75
59	Wheels, new, steel			Cost.
60	Loss of metal from steel-tired wheels, $2.00 per 1-16 inch.			
61	Labor changing, per pair			$2.00
62	Removing, turning and replacing steel-tired wheels			7.00
63	Steel-tired, cost of retiring to be cost with the addition of freight charges.			

LIST OF RAILROAD COMPANIES.

The following is a complete list of the railroad companies which have given notice of the adoption of the Code of Rules for the interchange of passenger equipment cars:

Arizona & South-Eastern.
Atlantic, Valdosta & Western.
Baltimore & Ohio.
Bangor & Aroostook.
Boston & Albany.
Boston & Maine.
Burlington, Cedar Rapids & Northern.
Butte, Anaconda & Pacific.
Cairo, Vincennes & Chicago.
Canadian Pacific.
Central Vermont.
Chesapeake & Ohio.
Chicago & Erie.
Chicago & North-Western.
Chicago, Burlington & Kansas City.
Chicago, Burlington & Quincy.
Chicago, Milwaukee & St. Paul.
Chicago, Rock Island & Pacific.
Choctaw, Oklahoma & Gulf.
Cincinnati, Hamilton & Dayton.
Cincinnati, New Orleans & Texas Pacific.
Cleveland, Cincinnati, Chicago & St. Louis.
Cleveland, Lorain & Wheeling.
Cleveland Terminal & Valley.
Colorado & Southern.
Cornwall & Lebanon.
Delaware, Lackawanna & Western.
Denver & Rio Grande.
Detroit, Toledo & Milwaukee.
Detroit & Lima Northern.
Erie.
Fitchburg.
Florida Central & Peninsular.
Florida East Coast.
Fort Worth & Denver City.
Golden Circle.
Grand Rapids & Indiana.
Grand Trunk Ry. System.
Green Bay & Western.
Hannibal & St. Joseph.
Hutchison & Southern.
Illinois Central.
Kanawha & Michigan.
Kansas City Southern.
Kansas City, St. Joseph & Council Bluffs.
Lake Shore & Michigan Southern.
Lehigh Valley.
Louisiana & Arkansas.
Manitoba & North-Western Railway of Canada.
Mason City & Fort Dodge.
Midland Valley.
Minneapolis & St. Louis.
Mississippi & Bonne Terre.
Mississippi River, Hamburg & Western.
Missouri Pacific.
Mobile & Birmingham.
Nacozari.
Nashville, Chattanooga & St. Louis.
New York Central & Hudson River.
New York, Ontario & Western.
New York & Ottawa.
Northern Pacific.
Oregon Railway & Navigation Co.
Pennsylvania, Poughkeepsie & Boston.
Pere Marquette.
Philadelphia & Reading.
Pittsburgh & Lake Erie.

Pittsburgh & Western.
Plant System.
Rio Grande, Sierra Madre & Pacific.
Rio Grande Western.
Rock Island & Peoria.
San Antonio & Aransas Pass.
Sioux City & Northern.
Southern.
Southern Indiana.
Southern Pacific Company.
South Florida.
Southwestern of Arizona.
Spokane Falls & Northern.
St. Louis, Chicago & St. Paul.
St. Louis, Iron Mountain & Southern.
St. Louis, Kansas City & Colorado.
St. Louis, Keokuk & North-Western.
St. Louis South-Western.
St. Louis South-Western of Texas.
St. Louis & Hannibal.
Temiskaming & Northern Ontario.
Texas & Pacific.
Toledo & Ohio Central.
Toledo & Ohio Central Extension.
Toledo, Columbus & Cincinnati.
Tyler South-Eastern.
Union Pacific.
United Counties.
Vera Cruz & Pacific.
Wabash.
West Virginia Central & Pittsburgh
Wheeling & Lake Erie.
Zanesville & Western.

MINUTES OF MEETINGS OF THE EXECUTIVE COMMITTEE.

MINUTES OF MEETING OF THE EXECUTIVE COMMITTEE OF THE MASTER CAR BUILDERS' ASSOCIATION, HELD AT HOTEL BELMONT, NEW YORK CITY, OCTOBER 21, 1907, AT 10:15 A.M.

Present: Messrs. G. N. Dow, R. F. McKenna, R. W. Burnett, F. H. Clark, T. H. Curtis, J. F. Walsh, F. N. Hibbits and F. T. Hyndman.

The minutes of the meeting of June 19, 1907, were read and approved.

A communication from Mr. G. P. Conard, Secretary, Association of Transportation and Car Accounting Officers, presenting resolutions adopted at the convention of that association, in regard to harmonizing the terms used in designating different kinds and classes of cars, was read, and the Secretary instructed to advise that association that the matter should be referred to the American Railway Association.

A communication from Mr. J. F. Tucker, chairman of the Central Freight Association, Chicago, Ill., regarding the matter of a standard grain door, was read, and on motion the Secretary was instructed to acknowledge same and advise that the matter would be given proper attention, and that as soon as anything definite was arrived at, advice would be given accordingly.

On motion of Mr. Walsh the matter was laid on the table.

A communication from Mr. A. W. Gibbs regarding the subject of house car doors, was read, and the Secretary was instructed to refer the matter to the Committee on Side Door and End Door Fixtures.

The Secretary reported that, in accordance with the instructions of the Executive Committee at its last meeting, the Committee on Air Brake Tests had been instructed to go ahead with the revision of the air-brake testing rack at Purdue University in accordance with the proposition submitted by that committee, the expense not to exceed $2,236.65.

The Secretary reported that since the last meeting of the Executive Committee the question of the appointment of a committee on Location of Ends of Running Boards and Side Door and End Door Fixtures had come up, and that the President had named suitable committees thereon; the action of the President was approved.

A communication from the Chicago & Milwaukee Electric Railroad Company, in regard to becoming a member of the Association, was read, and on motion the Secretary was instructed to advise the party that the laws of the Association as now existing permits him to become a member.

A communication from the American Railway Engineering & Maintenance of Way Association, regarding the matter of flat spots on wheels under cars of 100,000 pounds capacity, was read, and on motion the matter was referred to the Arbitration Committee to take up with the Maintenance of Way people.

A communication from the Quincy Freight Bureau, Quincy, Ill., regarding the matter of advertising on freight cars, was read and laid on the table.

A communication from Mr. A. W. Gibbs, General Superintendent Motive Power of the Pennsylvania Railroad, in regard to what shall be considered as an advertisement on freight cars, was read, and the Secretary instructed to advise Mr. Gibbs that the matter should be brought to the attention of the American Railway Association.

A communication from the Western Wheeled Scraper Company, Aurora, Ill., making application for membership in the Association, was read, and the Secretary was instructed to advise the Western Wheeled Scraper Company that they were not eligible to membership in the Association.

There being no further business the meeting adjourned.

JOS. W. TAYLOR,
Secretary.

Minutes of Joint Meeting of the Executive Committee of the Master Car Builders' Association and the American Railway Master Mechanics' Association, Held at the Hotel Belmont, New York City, October 21, 1907, at 10:30 a.m.

Present for the Master Car Builders: Messrs. George N. Dow, R. F. McKenna, R. W. Burnett, T. M. Ramsdell (proxy, J. F. Walsh), F. H. Clark, T. H. Curtis, J. F. Walsh and F. T. Hyndman.

Present for the Master Mechanics: Messrs. William McIntosh, G. W. Wildin (proxy, William McIntosh), F. H. Clark, A. E. Mitchell (proxy, J. W. Taylor), C. E. Fuller, T. H. Curtis, C. A. Seley, John Howard and F. M. Whyte.

The Supply Men's Association was represented by Mr. R. T. Walbank and various members of the executive committee of that association.

The report of the subcommittee, consisting of Messrs. Dow, McIntosh and Walbank, was presented by Mr. Walbank, indicating that Atlantic City and Saratoga were applicants for the convention. Mr. Walbank stated that representatives of these places were at hand and suggested that they be notified to present such additional claims as they desired. On motion this suggestion was approved, whereupon Mr. McNulty, President of the Village of Saratoga, and Mr. Walbridge, of the Business Men's Association, spoke in behalf of Saratoga. On their retirement the representatives of Atlantic City were received, and their claims were presented by Mr. A. T. Bell. After their retirement an informal ballot was taken, resulting in Saratoga — 10, Atlantic City — 8. Mr. Whyte then moved that the informal ballot be made formal. The first and second ballots were ties, 9 each, the third ballot resulted in Atlantic City 11, Saratoga — 7, whereupon Atlantic City was declared as the choice of the Executive Committees for holding the 1908 convention. It was decided that the Master Car Builders' convention would be held on Wednesday, Thursday and Friday, June 17, 18 and 19, and the Master Mechanics' convention on Monday, Tuesday and Wednesday, June 22, 23 and 24, 1908. The headquarters will be at the Marlborough-Blenheim Hotel.

A proposition was received from the Hotel Men's Association, Atlantic City, proposing the erection of a permanent exhibition hall on Young's Ocean Pier, providing the Associations would agree to hold their conventions of 1909, 1910, 1911, 1912 and 1913 at Atlantic City. This was considered and laid on the table.

There being no further business the meeting adjourned.

JOS. W. TAYLOR,
Secretary.

MINUTES OF MEETING OF THE EXECUTIVE COMMITTEE OF THE MASTER CAR BUILDERS' ASSOCIATION, HELD IN THE OFFICE OF THE SECRETARY, 390 OLD COLONY BUILDING, CHICAGO, ON MONDAY, APRIL 6, 1908, AT 10 A.M.

Present: Messrs. Dow, McKenna, Burnett, Ramsdell, Crawford, Clark, Curtis and Walsh. Mr. F. N. Hibbits was represented by his Master Car Builder, Mr. J. S. Lentz.

The Secretary stated that the meeting had been called in consequence of its having come to the attention of the members of the Executive Committee that certain diagrams relating to the standards of the Association for protection of trainmen, and which do not conform to the M. C. B. standards, had been promulgated in various quarters, and it was thought desirable that the subject should be given attention by the Executive Committee.

Mr. Crawford stated that he had examination made of cars belonging to quite a number of roads and private lines in the country, and found that in many respects the safety appliances on cars did not conform to the M. C. B. standards, and called the attention of the committee to the necessity of having the appliances in proper shape; also that the standards of the Association were in such shape that revision was badly needed. After a thorough discussion of the matter was had, on motion of Mr. Crawford, seconded by Mr. Clark, it was decided that a special committee be appointed of at least seven members, representing the different territories in the country, to take up the matter of the standards for the protection of trainmen with a view of so revising them that, first, the purposes for which they are intended will be carried out, as far as practicable with existing car construction, to conform to the Safety Appliance Act now effective; second, that these standards of the Association be so revised that the illustrations and text thereof will conform with each other.

The President named the following committee: C. A. Seley, chairman, R. F. McKenna, F. M. Whyte, A. LaMar, C. B. Young, B. Julien, E. Posson, T. H. Curtis, W. K. Carr.

There being no further business the meeting adjourned.

JOS. W. TAYLOR,
Secretary.

MINUTES OF MEETING OF THE EXECUTIVE COMMITTEE OF THE MASTER CAR BUILDERS' ASSOCIATION, HELD AT THE MARLBOROUGH-BLENHEIM HOTEL, ATLANTIC CITY, NEW JERSEY, JUNE 16, 1908, AT 8 P.M.

Present: Messrs. G. N. Dow, R. F. McKenna, R. W. Burnett, T. M. Ramsdell, D. F. Crawford, F. H. Clark, T. H. Curtis, J. F. Walsh, F. N. Hibbits (represented by J. S. Lentz) and F. T. Hyndman.

Minutes of the meeting of October 21, 1907, were read and approved as read. The minutes of the meeting of April 6, 1908, were read and approved as modified.

The annual reports of the Secretary and Treasurer were considered and ordered read in convention. On motion the annual dues were fixed at $4 per vote as formerly.

A communication from Mr. Arthur Hale, chairman of the Committee on Car Efficiency of the American Railway Association, in regard to maintenance of records of cars at the interchange points, was read and the Secretary instructed to advise Mr. Hale that the Executive Committee considered that this was a matter outside of the jurisdiction of the Master Car Builders' Association.

A communication from Mr. George R. Henderson, presenting resolutions regarding the introduction of a bill in Congress with reference to land grant colleges, was read and the Secretary instructed to notify Mr. Henderson it is the opinion of the Committee that it can not consistently recommend to the Association that any action be taken in the matter.

A communication from the Railway Club of Pittsburgh in regard to standardizing certain sections of "I" beams, etc., for use in designing and repairing steel cars and steel underframes, was read and referred to the Executive Committee which would be elected at this convention.

A communication from Mr. R. N. Durborow, S. M. P., Pennsylvania R. R., in regard to the purchasing of a dynamometer for measuring the side stresses on drawbars, was read and referred to the incoming Executive Committee.

A communication from Mr. D. F. Crawford, G. S. M. P., Pennsylvania R. R., submitting a series of resolutions in regard to modification of the Constitution and By-Laws, was read and ordered read in convention.

The proposal of Mr. Nathan H. Davis, President of the Davis Solid Truss Brake Beam Company, for associate membership, was read, and on motion the action on same was deferred one year.

The proposal of Mr. H. W. Wolff, Chief Mechanical Engineer of the American Car & Foundry Company, for associate membership, was read and action thereon deferred for one year.

A communication from Mr. Charles M. Muchnic, of the American Locomotive Company, proposing Mr. T. Sakuma, of the Mechanical Department of the Imperial Government Railways of Japan, for active membership, was read and approved.

A communication from the American Railway Association, in regard to harmonizing the terms used in designating different classes of cars, was read and referred to the incoming Executive Committee.

A communication from the President of the American Railway Engineering and Maintenance of Way Association, in regard to the question of the allowable length of flat spots on car wheels in connection with the effect of such defects on bridge structures and track, was read and referred to the incoming Executive Committee.

A letter from Mr. E. D. Bronner, S. M. P., Michigan Central R. R., in regard to home routing cars, was read and referred to the incoming Executive Committee.

The application of Mr. A. G. Steinbrenner for life membership in the Association was read, and the Secretary instructed to present same to the convention with the approval of the Executive Committee.

A communication from Mr. W. H. Lewis, S. M. P., of the Norfolk & Western, in regard to the introduction into the Rules of Interchange of provisions for the use of an axle for cars of 90,000 pounds capacity, was read and referred to the Committee on Standards, to consider whether there is any necessity for the introduction of such provisions in the Rules of Interchange.

A communication from Mr. Charles A. Wickersham, Chairman of the General Managers' Association of the Southeast, asking the Association to consider a rule for placarding cars for home return "Not to be loaded with freight that could be damaged by rain," when the bodies are defective, but the running gear all right, was read and the Secretary instructed to advise Mr. Wickersham that the Committee did not think it was within the province of the Master Car Builders' Association to consider the matter, it being an operating problem.

A communication from Mr. J. F. Tucker, chairman, Central Freight Association, asking the Master Car Builders to present dimensions for a standard grain door, was read and referred to the incoming Executive Committee.

A communication from Mr. J. D. McAlpine, in regard to expense of preparing index for the Rules of Interchange, was read and referred to the incoming Executive Committee.

A communication from the President of the General Managers' Association of Texas, in regard to fastening handholds and steps with lag screws, was read and referred to the Committee on Protection of Trainmen.

A communication from the American Railway Association respecting the question of remedy for brine dripping from refrigerator cars and damaging track and bridges, and requesting that this subject be given consideration and acted upon by this Association, was read and referred to the incoming Executive Committee.

The Secretary presented some correspondence from Mr. R. N. Durborow, Chairman of the Committee on Coupler Tests, which had already been referred to the members of the Executive Committee by correspondence, in regard to a provision for stamping " M. C. B." on couplers and knuckles, authorizing the coupler companies to make inspection and tests and do the stamping, was read and the approval of the Executive Committee given to the recommendations of the Coupler Committee.

The report of the Committee on Protection of Trainmen was considered and the members of the committee invited to be present. After a thorough discussion of the subject an adjournment was taken until June 18, 1908, at 3 o'clock P.M.

JOS. W. TAYLOR,
Secretary.

MINUTES OF MEETING OF THE EXECUTIVE COMMITTEE OF THE MASTER CAR BUILDERS' ASSOCIATION, HELD AT THE MARLBOROUGH-BLENHEIM HOTEL, ATLANTIC CITY, NEW JERSEY, ON JUNE 18, 1908, AT 3 P.M.

Present: Messrs. G. N. Dow, R. F. McKenna, D. F. Crawford, F. H. Clark, T. H. Curtis, J. F. Walsh, F. N. Hibbits (represented by J. S. Lentz).

The report of the Committee on Protection of Trainmen, which was under consideration when the meeting of June 16 adjourned, was further considered, and on motion of Mr. Clark, duly seconded, it was agreed that the report be presented to the convention and that a motion be made that owing to the fact that the report has not been in the hands of the members long enough for definite action to be taken by the convention, that the report be referred to the Executive Committee with power to act, the Executive Committee to submit such of the recommendations as it deems expedient to letter ballot. The motion was unanimously adopted.

The question referred to the Executive Committee by the convention as to the date when cars should be equipped with standard M. C. B. air hose was considered, and on motion, duly seconded, it was agreed that Rule 35 of the Rules of Interchange should be modified, fixing the date as June 1, 1909.

The proposal of Prof. C. H. Benjamin, of Purdue University, for associate membership was approved, and the Secretary instructed to present same to the convention in accordance with the Constitution.

The application of Mr. Charles H. Cory for life membership in the Association was approved, and the Secretary instructed to propose his name to the convention.

The application of Mr. W. H. Thomas for life membership in the Association was approved, and the Secretary instructed to present the name of Mr. Thomas to the convention. The meeting then adjourned.

JOS. W. TAYLOR,
Secretary.

MINUTES OF MEETING OF THE EXECUTIVE COMMITTEE OF THE MASTER CAR BUILDERS' ASSOCIATION, HELD IN THE GREEK TEMPLE, MILLION-DOLLAR PIER, ATLANTIC CITY, NEW JERSEY, ON FRIDAY, JUNE 19, 1908, AT 1:30 P. M.

Present: Messrs. R. F. McKenna, F. H. Clark, T. H. Curtis, L. G. Parish, D. F. Crawford, C. E. Fuller, H. D. Taylor and C. A. Shroyer.

Mr. Jos. W. Taylor was reëlected Secretary; salary same as heretofore.

The Secretary was instructed to keep the funds of the Association in the Illinois Trust & Savings Bank, Chicago, Illinois.

The report of the Committee on Protection of Trainmen, which was referred to the Executive Committee by the Association to consider before the recommendations were submitted to letter ballot, was taken up, and the Secretary instructed to prepare a printed report in accordance with the modifications suggested at the convention and send it to the members, with a letter requesting such suggestions as they deemed desirable, the replies to be in the office of the Secretary by July 6, 1908.

The Secretary was instructed to call a meeting of the Executive Committee in Chicago at the suggestion of the President, for further consideration of the report.

The Secretary was instructed to prepare a list of the subjects referred to the Executive Committee by the convention for its consideration when it meets at the call of the President.

There being no further business the meeting adjourned.

JOS. W. TAYLOR,
Secretary.

MINUTES OF MEETING OF THE EXECUTIVE COMMITTEE OF THE MASTER CAR BUILDERS' ASSOCIATION, HELD IN THE OFFICE OF THE SECRETARY, 390 OLD COLONY BUILDING, CHICAGO, ILLINOIS, MONDAY, TUESDAY AND WEDNESDAY, JULY 13, 14 AND 15, 1908.

Present: R. F. McKenna, F. H. Clark (proxy, C. B. Young), T. H. Curtis (proxy, Mr. Hedgecock), Le Grand Parish, J. E. Muhlfeld, H. D. Taylor, J. F. Walsh (proxy, T. M. Ramsdell), C. A. Schroyer.

The minutes of the meetings of June 18 and 19, 1908, were read and approved.

The appointment of Mr. C. A. Coolidge, Superintendent Oregon Electric Railway Company, for representative membership, was considered, and in this connection the general question of the admission of electric roads to membership in the Association, and on motion, duly seconded, it was decided that where it is the intention of an electric road to become a subscriber to the Rules of Interchange, and be governed by the rules of the Association, their representatives would be entitled to membership in the Association. The Secretary was instructed to handle similar future cases accordingly.

A communication from Mr. J. S. Lentz, M. C. B., Lehigh Valley Railway, regarding the application of armored hose to freight cars under the Rules of Interchange, was considered, and on motion the subject was referred to the Committee on Air Brake Hose, to make tests of the armored hose to find out whether the hose without the armor will meet the requirements of the M. C. B. specifications.

The Committee then considered the subjects referred to it by the convention for investigation and formulated a list of subjects and committees for the convention of 1909, as shown in the report of proceedings.

In order that the work of the convention may be expedited the following suggestions regarding the preparation and presentation of the reports of committees were adopted, and the Secretary instructed to advise the committeemen and members accordingly:

MEMORANDUMS.

1. That the chairmen of all standing and special committees prepare their circular of inquiry and submit the same to the Secretary for printing and issuing prior to September 1, 1908.

2. All active, representative, and associate members of the Association should, immediately on receipt of this circular, transmit to the chairmen of the respective committees all the information they may have on each subject, which they consider will be of assistance to the respective committees in preparing their reports.

3. That prompt replies be made to the circulars of inquiry as issued by the various committees.

4. That the chairmen of all standing and special committees must have their reports in the office of the Secretary not later than April 1, 1909, in order that the same can be printed and issued by May 1, 1909.

5. Committee reports which do not reach the Secretary in time for printing and issuing by May 1, 1909, will be referred to the Executive Committee to decide whether the report shall be submitted to the convention.

6. That abstract only of all reports of standing and special committees be read by the chairman of the same before the convention, together with whatever additional data may have been accumulated after April 1, 1909, to the time of the convention.

7. That the members of standing and special committees, who may individually or collectively submit a minority report, must prepare the same so that it can be issued with the report of the majority of the committee, and substituted for the majority report in event the convention should so decide.

8. That each member of a standing or special committee sign either the majority or the minority report.

On motion the Secretary was instructed to advise the Railway Supply Men's Association that it is the desire of the Executive Committee of the Master Car Builders' Association, that they instruct all of their members and exhibitors to discontinue the general practice of issuing souvenirs at our conventions.

During the discussion on the arrangement of committees the following communications were considered:

1. From the Association of Transportation and Accounting Officers regarding the home routing of damaged, wrecked or worn-out cars. The Secretary was instructed to advise the Association that the subject is not one on which the Master Car Builders' Association could take definite action, but one for the American Railway Association; that it is the opinion of the Executive Committee that the home routing of cars should be handled by the shortest movement consistent with their rules and regulations; that this is a matter that should be referred by the Association

of Transportation and Accounting Officers to the American Railway Association.

2. From the American Railway Association regarding the harmonizing of the terms used in designating the different classes of cars and different kinds of cars in each class according to their physical characteristics. A committee was appointed to take up this classification.

3. From the American Railway Association regarding a remedy for damage to track and bridges by brine dripping from refrigerator cars. A committee was appointed to investigate the subject.

4. From the American Railway Engineering and Maintenance of Way Association regarding the effect upon bridges and tracks of flat spots on car wheels.

The letter was referred to the Committee on Car Wheels with instructions to confer with the committee of the American Railway Engineering and Maintenance of Way Association and ascertain just what apparatus they propose to construct, and just what data they expect to obtain, and to advise the Executive Committee whether, in their judgment, the results would be such as to justify the expenditure of any money by the Master Car Builders' Association.

5. From the American Railway Engineering and Maintenance of Way Association on the subject of widening of gauge on curves, it having developed that the minimum tread of car wheels has an important bearing on the question. The subject was referred to the Committee on Car Wheels, the chairman being authorized to appoint a subcommittee to confer with committees of other associations interested.

A proposition from the Committee on Tests of M. C. B. Couplers, regarding the purchase from Wm. Sellers & Co. of a dynamometer for measuring the side stresses on couplers, at a cost of $625, exlusive of the cost of calibration, was considered, and the expenditure authorized.

The question of dividing the book of Rules of Interchange was considered, and it was decided that but one book should be printed; that it be rearranged, including in the front part thereof everything that pertains to car inspection, and in the back portion everything that pertains to billing.

The report of the Committee on Standards for the Protection of Trainmen, which was referred to the Executive Committee at the convention in June, for consideration before submitting recommendations made by the committee to letter ballot, was then taken up, and the recommendations of the committee modified as shown in the letter ballot for this year.

The question of whether a separate pamphlet containing the standards relating to safety appliances should be issued was considered, and it was decided that it was not desirable or necessary.

The question of what part of the letter ballot should be submitted to the American Railway Association for approval before being distributed to the members, was discussed, and it was decided that inasmuch as the American Railway Association plan of reorganization was not perfected it would be unnecessary to submit the proposed ballot to the American Railway Association.

It was decided that in submitting to letter ballot the proposed modifications of the safety appliance standards that three divisions be made, as follows:

1. Those relating to freight cars.
2. Those relating to caboose cars.
3. Those relating to passenger cars.

The question of what constitutes an advertisement under the provisions of Rule 41 of the Rules of Interchange was considered, and on motion, duly seconded, it was suggested that cards of a dimension not exceeding 5 by 8 inches, containing the name of the railroad company and consignee or consignor printed in the usual type, will not be considered as an advertisement, and the Secretary instructed to advise the Arbitration Committee of this resolution.

The question of a proper definition of the term "advertising" was referred to the subcommittee appointed to confer with the American Railway Association on various matters to learn their disposition in the matter.

A communication from the Central Freight Association regarding proper dimensions for grain doors was read and referred to the Committee on Side and End Door Fixtures.

A series of resolutions from the Association of Transportation and Accounting Officers regarding the light-weighing and stenciling of cars, which had previously been considered by the Arbitration Committee and by that committee referred to the Executive Committee, were considered, and on motion the Secretary was instructed to advise the Association of Transportation and Accounting Officers that as this is a transportation problem it should be taken up by that association with the American Railway Association.

On motion an adjournment was taken, the date to be fixed by the President, the meeting to be held in the Engineer's Club, New York city.

JOS. W. TAYLOR,
Secretary.

CIRCULAR RELATING TO LETTER BALLOT.

To the Members:

At the Convention of 1908, the following questions were ordered submitted to letter ballot. These questions, in so far as they relate to the Standards, you will find under paragraphs Nos. 1 to 37, and those relating to Recommended Practice in paragraphs A to GG.

Each member is requested to vote by writing " Yes " or " No " opposite the number or letter on each question on the accompanying slip, which corresponds with the number or letter on the letter ballot, and mail it to the Secretary, 390 Old Colony Building, Chicago, Ill.

A vote " Yes " will mean that the subject is to be adopted as a Standard or Recommended Practice, as explained in the text, and a vote " No " will mean that it is not to be adopted.

The votes will be counted on September 5, 1908, and any votes received at the Secretary's office after that date will be excluded from the count, as provided by the Constitution.

All votes must be either " Yes " or " No " to be counted in the result, as no qualified votes will be considered. The number of votes should agree with the bills for 1908, or the Secretary should be advised of any needed corrections.

STANDARDS.

FROM THE COMMITTEE ON REVISION OF STANDARDS

STANDARD JOURNAL BOX AND CONTAINED PARTS FOR JOURNALS 3¾ BY 7 INCHES.

Sheet M. C. B. 3, pages 552-3.

The Committee on Revision of Standards recommends that a dimension of 3-16 inch be shown as the distance from the center line of bolt hole to inside bearing face of lid.

1. Do you favor this recommendation?

STANDARD JOURNAL BOX AND CONTAINED PARTS FOR JOURNALS 4¼ BY 8 INCHES.

Sheets M. C. B. 4, 5 and 6, pages 552-3.

The Committee on Revision of Standards recommends that the inside dust guard wall be restored at the top and that it be joined to the inside side wall with an opening 2¾ inches radius, with the center located one inch above the horizontal center line of the box.

2. Do you favor this recommendation?

STANDARD JOURNAL BOX AND CONTAINED PARTS FOR JOURNALS 5 BY 9 INCHES.

Sheets M. C. B. 13 and 14.

The Committee on Revision of Standards recommended that the dimension from center line of journal box to edge of wedge stop be changed from 5 3-16 inches to 5⅛ inches, which would give 1-16-inch clearance, the same as in the 4¼ by 8 and 5½ by 10-inch boxes.

When this suggestion was under discussion at the convention, some objections were raised to the 1-16-inch clearance, it being the opinion of some of the members that the proper clearance is ⅛ inch. The committee was of the opinion that uniformity of clearance should exist in all the boxes, and it was therefore decided to submit the two clearance dimensions to letter ballot with the understanding that the dimension adopted should be the standard dimension for the 4¼ by 8, 5 by 9 and 5½ by 10-inch boxes. Members are therefore requested to vote on but one of the two following questions:

3. Are you in favor of 1-16-inch clearance?

4. Are you in favor of ⅛-inch clearance?

The Committee on Revision of Standards recommends that the center of box from which the lower half of the circle is struck be raised ¼ inch in order to increase the depth to 1⅝ inches, corresponding with the present depth of the 5½ by 10-inch box.

5. Do you favor this change?

STANDARD JOURNAL BOX AND CONTAINED PARTS FOR JOURNALS 5½ BY 10 INCHES.

Sheet M. C. B. 16, pages 552-3.

The Committee on Revision of Standards proposes to eliminate the note on this sheet reading:

"N. B.—Total lateral (extreme positions of axle) equals ⅜ inch."

6. Do you favor this elimination?

The Committee on Revision of Standards proposes to change the note reading "5 11-16 inches to end of wedge and face of stop" to read "5 11-16 inches to face of stop."

7. Do you favor this change?

AXLES.

Sheet M. C. B. 7, pages 554-6.

When the suggestion of the Committee on Standards regarding axles was under discussion, it was stated that some failures at the center had occurred due to grooving at the juncture between the cylindrical portion and the tapered portion of the axles. To prevent these failures the taper had been gradually worked down to the center by joining the tapered portions with the following radii:

Axle A.	3¾ by 7-inch journal.		13	feet,	0	inches	radius.
" B.	4¼ by 8	" "	14	"	0	"	"
" C.	5 by 9	" "	15	"	0	"	"
" D.	5½ by 10	" "	26	"	8	"	"

On motion, it was decided to refer these dimensions to letter ballot for adoption.

8. Do you favor this change?

BRAKE HEAD AND SHOE.

Sheet M. C. B. 8, pages 557-8.

The Committee on Revision of Standards proposes to increase to 9-16 inch in depth on level with top and bottom stop for brake head, the present 5-16-inch projection, top and bottom, at back of brake shoe which forms spacer between lugs of brake head for the purpose of better maintaining the position of the shoe.

9. Do you favor this change?

BRAKE BEAM HANGERS AND PINS.

Page 623, Proceedings 1907.

At the convention the question of standard sections of bar for brake beam hangers and pins was considered, and on motion it was decided to submit to letter ballot two sizes — one for adoption as a Standard, the other as a Recommended Practice. The present Recommended Practice is ⅞ inch. It was thought advisable to propose that this be made a Standard and under the caption of Recommended Practice (which see) another dimension be adopted. The question to be determined is:

10. Are you in favor of advancing from Recommended

Practice to Standard the provision that brake hangers and pins shall be ⅞ inch in diameter?

STANDARDS FOR AIR BRAKES ON FREIGHT CARS.

Sheet M. C. B. 9.

The Committee on Revision of Standards suggests that the diameter of the holes in the dead and live lever, cylinder lever, floating lever, floating lever bracket, dead lever guide, truck lever connections and connecting rods be omitted, and that a note be added to this sheet as follows:

All holes for brake pins not less than 1 3-32-inch diameter nor more than 1⅛-inch diameter.

11. Do you favor this change?

BRAKE BEAMS.

Sheet M. C. B. 22, pages 558-9.

Believing that standard brake beams are advisable and desired by the Association, and that the recommendations made last year were defeated on account of test limitations, the Committee on Revision of Standards has determined to lower the limits of deflection, and having this lowering of the test limitations in mind, renews the suggestions of last year that two brake beams and tests for same be adopted as standard, as follows:

Brake beam No. 1, to be suitable for cars weighing not over 35,000 pounds light weight.

12. Do you favor the adoption of this standard?

Brake beam No. 2, to be suitable for cars exceeding 35,000 pounds light weight.

13. Do you favor the adoption of this standard?

BRAKE BEAM TESTS.

For each 500 brake beams or less, which pass inspection and are ready for shipment, one representative beam shall be taken at random and subjected by the company manufacturing the beams, and in the presence of the railroad company's inspector, to the following test in a suitable machine:

The beams shall be equipped with suitable heads and shoes, and the shoes placed in contact with castings representing the tread of the wheel; when mounted in this manner the load shall be applied to the fulcrum in the normal line of pull. As a preliminary to the test a load of 6,000 pounds shall be applied and released, after which observations for records shall be taken. Beam No. 1, under a load of 6,500 pounds shall not deflect to exceed .0625 inch; beam No. 2, under a load of 12,000 pounds shall not deflect to exceed .0625 inch.

In case a beam shall fail in this test, then a second beam shall be taken from the same lot and similarly tested. If the second beam stands the test it shall be optional with the inspector whether he shall test a third beam or not. If he does not do so, or if he does, and the third beam stands the test, the 500 beams or less shall be accepted as filling the requirements of this test.

Individual beams will not be accepted which (1) do not conform to standard dimensions, and (2) those that have physical defects. Any lot of 500 beams, or less, submitted for test that fail to meet the prescribed test will not be accepted.

14. Do you favor these proposed tests as standard?

Outside Hung Brakes.— On cars built after September 1, 1909, it will not be permissible to hang brake beams from any portion of the body of the car.

15. Do you favor this modification of the brake beam specifications?

SIDING, ROOFING, FLOORING AND LINING.

Sheet M. C. B. 24, page 578.

The Committee on Revision of Standards suggests that inasmuch as it is the general practice to dress flooring to a face width ¼ inch greater than shown on Sheet 24, the dimensions shown thereon should be increased to that extent.

16. Are you in favor of this change?

The committee also suggested that a drawing be added to Sheet M. C. B. 24, showing details of flooring 2⅜ inches thick, now in common use in cars for rough freight.

17. Are you in favor of this addition?

The committee also suggested that the drawing on Sheet M. C. B. 24 be revised to show separate sections for roofing and lining.

18. Are you in favor of this revision?

WROUGHT-IRON PIPE AND PIPE FITTINGS.

The Committee on Revision of Standards approved the recommendation of Mr. Gibbs, of the Pennsylvania Railroad, that all wrought-iron pipe for car work be threaded with a standard total taper of ¾ inch in one foot, and that all pipe fittings be tapped to suit the standard pipe thread with a total taper of ¾ inch in one foot, so that the thread on pipe and fittings will be uniform and taper tight.

The question to be determined is:

19. Are you in favor of the adoption as standard of the provision that wrought-iron pipe and all fittings be threaded with standard pipe thread and total taper of ¾ inch in one foot?

SPECIFICATIONS FOR WOVEN AND COMBINATION WOVEN AND WRAPPED AIR BRAKE HOSE.

Pages 600-602, Proceedings 1907.

The Committee on Revision of Standards recommends that the specifications for woven and combination woven and wrapped air brake hose, shown on pages 600-602, Proceedings, 1907, be advance from Recommended Practice to Standard.

20. Do you favor this suggestion?

FROM THE COMMITTEE ON TESTS OF COUPLERS.

COUPLERS.

Sheet M. C. B. 11, pages 560-1.

The Committee on Tests of Couplers recommends that the use of 1¼-inch rivets for attaching yokes to coupler butts be advanced from Recommended Practice to Standard.

21. Do you favor this change?

The Committee on Tests of Couplers recommends that the rivet holes in coupler butts be changed from 1 3-16 inches to 1 5-16 inches diameter, to conform to the recommendation regarding the use of 1¼-inch rivets.

22. Do you favor this change?

The Committee on Tests of Couplers recommends that the third sentence in paragraph 5 of the specifications for couplers (page 564, Proceedings, 1907) be changed to read: "The holes for pivot pins in lugs of bars and knuckles should be drilled, or, if cored, must be broached out, and must not be more than 1-16 inch larger than pin, and the rivet holes in the butts must be drilled, or, if cored, must be broached out."

23. Do you favor this addition?

The Committee on Tests of Couplers recommends that all new types of couplers put on the market after January 1, 1909, have a dimension of 9¼ inches from back of coupler horn to inside face of knuckle, and that the face or front wall of coupler have a minimum thickness of 1¼ inches, and that a note to this effect be added to coupler drawing on Sheet M. C. B. 11.

24. Do you favor the above changes?

The Committee on Tests of Couplers recommends that the total lift of the locking pin be not more than 6 inches, and that a note to this effect be added to the coupler drawing on Sheet M. C. B. 11.

25. Do you favor this specification?

The Committee on Tests of Couplers recommends that all couplers must have an eyelet for locking device located immediately above locking-pin hole so that the recommended links and clevises can be applied, and that a note to this effect be added to coupler drawing on Sheet M. C. B. 11.

26. Do you favor this specification?

The Committee on Tests of Couplers recommends that the pulling test for automatic couplers (test No. 4, third line, page 567, Proceedings, 1907) be changed to read as follows:

> The couplers must stand a steady pull of 150,000 pounds. A coupler shall be considered as having failed to stand this test if it is broken before it has been pulled the prescribed number of pounds, or if any cracks appear more than one inch long or open more than 1-16 inch, or if the knuckle has opened more than ⅝ inch from its original position when pulled out against the lock. . . . Should either or both couplers fail to stand the prescribed test, but both stand 100,000 pounds, another complete coupler or pair of couplers shall be provided as per section 8 governing retest.

27. Do you favor this change?

STANDARD MARKING OF FREIGHT CARS.

Page 579, Proceedings 1907.

The committee on the above subject suggested the following changes in the text of standards, page 579, Proceedings, 1907, relating to the subject:

Paragraph 1. Change to read:

> That on all box cars standing more than twelve (12) feet from top of rail to eaves, the height and width at eaves be stenciled in 3-inch letters on side of car, as near the bottom as convenient.

28. Are you in favor of this change?

Paragraph 2. Omit this paragraph relating to stenciling the initials and numbers on floor or cross-tie timbers of box, stock and other roofed cars.

29. Do you favor this omission?

Paragraph 3. Change to read:

That all classes of cars have size of coupler, style of rear attachments, kind of draft gear and style of brake beam stenciled in 2 or 3-inch letters on each side of car at opposite ends, or on each end of car directly above coupler where design of car permits. Where the kind of draft gear implies the style of rear attachments, the marking for the latter may be omitted.

30. Do you favor this change?

Paragraph 5. Omit the following:

That on all cars equipped with air brakes, the word "air brakes" in letters less than 3 inches high be stenciled on the sides or ends of the cars, and that the make of the air brake equipment be stenciled (in smaller letters if desired) over or just preceding these words, to enable inspectors to detect repairs made with wrong materials.

31. Do you favor this omission?

Paragraph 6. Omit the following:

In 1902 the following additions were made to prevent errors in filling out M. C. B. defect and repair cards, and to at once identify the end of the car on which defects are found or repairs made.

32. Do you favor this omission?

Paragraph 7. Omit the following:

All freight equipment cars used in interchange shall be stenciled with a letter "B" on the end of car upon which the brake shaft is located and with the letter "A" on the opposite end. On cars having brake shafts on both ends, the end toward which the brake-cylinder push rod travels should be stenciled "B" and the opposite end "A." The stenciling shall be in plain black letters not less than 2 inches high, enclosed in a circle not less than 2¾ inches in diameter, as shown in Figs. 1 and 2, Sheet M. C. B. 24.

33. Do you favor this omission?

Paragraph 8. Omit the following:

The location of the lettering to be as near the center line of end of car as convenient, and where possible be not less than ten inches nor more than fourteen inches above the buffer block on box, stock and other classes of cars having stationary ends, and to be located on the end sill near the buffer block, or on the face of buffer block near the top, on other classes of cars. See Figs. 3, 4 and 5, Sheet M. C. B. 24.

34. Do you favor this omission?

SAFETY APPLIANCES.

Pages 582-585. Sheet M. C. B. 19 and details 19-A to 19-P.

The committee on revision of these standards submitted some modifications to the convention, and owing to the fact that the report of the committee had not been in the hands of the members a sufficient length of time to allow definite action to be taken, on motion the recommendations were referred to the Executive Committee to consider in connection with any suggestions which might be submitted by the members. A letter of inquiry to the members was sent out and the suggestions submitted, together with the report of the committee, were carefully considered by the Executive Committee, and certain modifications made as follows:

SAFETY APPLIANCES.—FREIGHT TRAIN CARS.

PREFACE.

Cars of construction not covered specifically in the following sections, relative to handholds, sill steps and ladders, and not shown by the drawings on Sheet M. C. B. 19, shall be considered as of special construction but shall have the same complement of handholds, sill steps and ladders as are required for cars of the nearest approximate type.

BRAKE SHAFTS.

(1) The brake shaft to be located on the end of car, preferably to the left of the center thereof, when facing the end of car. **Brake-shaft location.**

(2) On cars without fixed ends the location of brake shafts to be suitable to the car construction and operation. **On open-end cars.**

Ratchet wheel.

(3) The ratchet wheel to be secured from turning on the brake shaft.

Brake pawl.

(4) The brake pawl to be fastened to a suitable casting or plate attached to the car body or brake step.

References.

(5) See Proceedings 1888, pages 25 and 123; Proceedings 1893, 1896, 1907, 1908.

Running boards.

RUNNING BOARDS.

Width on house cars.

(1) Box and other house cars to be provided with running boards on roof, not less than 18 inches wide.

Width on tank cars.

(2) Longitudinal running boards on tank cars used in connection with safety railings to be not less than 10 inches. Running boards will not be required on tank cars having floors.

Projection.

(3) The ends of all running boards which project more than four inches over the edge of roof of ends of cars to be properly supported.

References.

(4) See Proceedings 1888, pages 24 and 123; Proceedings 1893, 1896, 1907 and 1908.

Sill steps.

SILL STEPS.

Number and location.

(1) One substantial sill step to be secured to each side of car at the lower right-hand corner, this being the corner on the right, when facing the side of car. The side of the sill step next to the corner to be as near as practicable to the end of the car.

Dimensions.

(2) Sill steps to be made of wrought iron or steel about ½ by 1½ inches cross sectional area or equivalent.

Width.

(3) Sill steps to be about 12 inches long between the sides, measured horizontally at the tread.

Height from rail.

(4) The lower treads of sill steps to be about 24 inches and not more than 32 inches above the rail, the clear depth of sill steps to be not less than 6 inches.

Deep steps.

(5) Sill steps exceeding 18 inches in depth to have an additional tread above the lower tread, and such sill steps to be laterally braced.

Fastenings.

(6) Each side of sill steps on cars to be securely fastened by means of lag screws, bolts or rivets.

References.

(7) See Proceedings 1888, pages 25 and 121; 1893, 1902, 1907 and 1908.

Ladders.

LADDERS.

Number.

(1) Box and other house cars and all cars, the top of which can

not be reached from sill steps or platform end sills, shall have two wrought iron or wooden ladders.

(2) Ladders to be located at diagonal corners, on right-hand end of sides of cars or left-hand side of ends of cars. When cars have platform end sills, ladders may be located near center of ends of cars. High side gondola cars with fixed ends having brake staff platform at one end of car should have ladders and sill steps on both sides at same end of car. **Location.**

(3) Ladder treads of wrought iron or steel, to be of ⅝-inch nominal diameter; or of hardwood, to be nominally 1½ by 2 inches, about 16 inches clear length. **Dimensions.**

(4) The spacing of treads of ladders to be about 18 inches. **Spacing.**

(5) All ladder treads shall have a minimum clearance around them of 2 inches, nominal clearance 2½ inches. **Clearance.**

(6) When wrought iron or steel ladders without sides are placed on ends of cars with non-projecting end sills, the bottom treads to have a guard or upward projection at inside ends. **Footguard.**

(7) Tank cars having running boards to be provided with suitable ladders to give access to the running boards; the ladders to be located on right-hand end of sides of cars or left-hand side of ends of cars when running boards are continuous around the car. If running boards are not continuous, ladders to be so located as to give access to each end of each running board. Treads of ladders to be spaced about 18 inches apart. **Tank-car ladders.**

(8) Arrangements of ladders are shown on Sheet M. C. B. 19, Figs. A, B, C and D, and on detail Sheets M. C. B. 19-A, 19-B, 19-C and 19-D. **Drawing references**

(9) See Proceedings 1902, 1906, 1907 and 1908. **References.**

HANDHOLDS.

Handholds.

(1) Box and other house cars shall have handholds on roofs, in line with each ladder, running parallel with the ladder treads. **Roof handholds.**

(2) Roof handholds to be placed not less than 2 inches nor more than 18 inches from the edge of the roof and the length to be not less than 10 inches in the clear, unless the construction of the car will not permit.

(3) *Box and other house cars with end ladders* to be provided with a horizontal or vertical handhold, 16 inches in the clear or longer, on each side of each car over sill step; if horizontal side handholds are used they shall be located not more than 30 inches above center line of coupler. **Box, etc. Side handholds.**

(4) Each end of car to be provided with two horizontal handholds, not less than 12 inches and preferably 16 inches in the clear or longer, **End handholds.**

located not over 30 inches above center line of coupler, or placed under the end sill as near the face as will insure a good safe fastening, or, if preferred, may be placed on the face of end sill. The coupler unlocking rod, the tread of the ladder or any suitably located part of the car which does not exceed two inches on each side or in diameter, and has the proper clearance, will be considered a suitable end handhold.

Drawing reference.

(5) Arrangement of handholds is shown on Sheet M. C. B. 19, Figs. A and B, and on detail Sheets M. C. B. 19-A and 19-B.

Box, etc. Side handholds.

(6) *Box and other house cars having side ladders* located over sill steps, a tread of such ladder, not over 30 inches above center line of coupler is an effective handhold.

End handholds.

(7) Each end of car to be provided with two horizontal handholds, not less than 12 inches and preferably 16 inches in the clear or longer, located not over 30 inches above center line of coupler or placed under the end sill as near the face as will insure a good safe fastening, or, if preferred, may be placed on the face of end sill. The coupler unlocking rod, or any suitably located part of the car which does not exceed two inches on each side or in diameter, and has the proper clearance, will be considered a suitable end handhold.

Drawing reference.

(8) Arrangement of handholds is as shown on Sheet M. C. B. 19, Figs. C and D, and on detail Sheets M. C. B. 19-C and 19-D.

Gondola cars drop ends. Side handholds.

(9) *Gondola cars with drop ends* to be provided with a horizontal or vertical handhold on each side of each car over sill steps, with as much clear length as the car construction will permit, provided same need not exceed 16 inches; and

(10) If horizontal side handholds are used they shall be located not more than 30 inches above center line of coupler.

End handholds.

(11) Gondola cars with drop ends to be provided with two end handholds not less than 12 inches and preferably 16 inches in the clear or longer, at each end of car, placed under the end sills as near the face as will insure a good safe fastening, and as shown on Fig. E, Sheet M. C. B. 19, detail Sheet M. C. B. 19-E; or,

Drawing reference.

(12) If preferred, the end handholds may be placed on the face of end sills, as shown on the alternate illustration, Fig. F, Sheet M. C. B. 19, detail Sheet M. C. B. 19-F.

(13) The coupler unlocking rod when properly located and having proper clearance around it under all conditions, including projecting loads, will be a suitable end handhold.

Gondola cars. Fixed ends. Side handholds.

(14) *Gondola cars with fixed ends* to be provided with a horizontal or vertical handhold, on each side of each car over sill steps, with as

much clear length as car construction will permit, provided handholds need not exceed 16 inches in length; and

(15) If horizontal handholds are used they shall be located not more than 30 inches above center line of coupler.

Top-end handholds.

(16) Gondola cars without projecting end sills, having ladders located on sides, to have one vertical or horizontal handhold at upper corner of left-hand side of brake end of car.

(17) Vertical handhold to extend downward from about 4 inches from top of car; horizontal handhold located about 6 inches from top of car.

End handholds.

(18) Each end of each car to be provided with two horizontal handholds not less than 12 inches and preferably 16 inches in the clear or longer, located not over 30 inches above the center line of coupler or placed under the end sill as near the face as will insure a good safe fastening, or if preferred, may be placed on the face of the end sill. The coupler unlocking rod, when properly located, and having proper clearance around it is a suitable end handhold.

Brake-step bracket as handhold.

(19) Exception to be made when the car is provided with a brake step, in which case the bracket of the brake step, if of suitable height, may be used as a handhold on that side of the end of car, as shown on Fig. G, Sheet M. C. B. 19, detail Sheet M. C. B. 19-G.

Drawing references.

(20) The arrangement without brake step is shown on Fig. H, Sheet M. C. B. 19, detail Sheet M. C. B. 19-H.

(21) High cars with vertical end handholds are shown on Fig. I, Sheet M. C. B. 19, detail Sheet M. C. B. 19-I.

(22) High cars with horizontal side handholds are shown on Fig. J, Sheet M. C. B. 19, detail Sheet M. C. B. 19-J.

Tank-car safety railings.

(23) *All tank cars* to have a safety railing for each running board, not less than 30 inches and not more than 5 feet above platform or above running board. Hand railing may be on the outside of running board, secured to side frame, or may be on the inside of running board, secured to tank or tank bands; or, in case of there being one overhead running board, the hand railing may be secured to top of tank, or tank bands.

Tank-head-top handhold.

(24) Tank cars with end platforms and without hand railings extending around the ends of the tank to have a horizontal handhold of as much length in the clear as the diameter of the tank will permit, secured to each head and located not less than 30 inches and not more than 5 feet above platforms.

Side handholds.

(25) Tank cars to be provided with a horizontal or vertical handhold, 16 inches in the clear or longer, on each side of each car over sill

steps. Tank cars having safety railings secured to the tank to be provided with an additional vertical handhold attached to the tank.

Safety-railing posts as handholds.

(26) Tank cars provided with side safety railings, supported by posts which are not more than 2 inches on each side or 2 inches in diameter; the posts are suitable side handholds if located over sill steps.

End handholds.

(27) Tank cars to be provided with two horizontal end handholds, not less than 12 inches and preferably 16 inches in the clear or longer, located not over 30 inches above the center line of coupler, and,

(28) If preferred, the end handholds may be placed on the face of the end sills or under the end sills as near the face as will insure a good safe fastening. The coupler unlocking rod, when properly located and having proper clearance around it, is a suitable end handhold.

Drawing references.

(29) Tank cars with side platform and hand railings secured to side frame to have handholds as shown on Fig. K, Sheet M. C. B. 19, detail Sheet M. C. B. 19-K.

(30) Tank cars without end sills, the end handholds may be secured to tank heads, or to end running boards on cars so equipped, as shown on Fig. L, Sheet M. C. B. 19, detail Sheet M. C. B. 19-L.

(31) Tank cars without through side sills but having running boards and safety railings secured to tank or tank bands to have handholds as shown on Fig. M, Sheet M. C. B. 19, detail Sheet M. C. B. 19-M.

Flat cars. Side handholds.

(32) *Flat cars* to be provided with a horizontal handhold on each side of each car over sill steps, with as much clear length as the car construction will permit, provided same need not exceed 16 inches.

End handholds and drawing references.

(33) Flat cars to be provided with two end handholds, not less than 12 inches and preferably 16 inches in the clear, at each end of car; placed under the end sills as near the face as will insure a good safe fastening, and, as shown on Fig. N, Sheet M. C. B. 19, detail Sheet M. C. B. 19-N; or,

(34) If preferred, the end handholds may be placed on the face of the end sills, as shown on the alternate illustration, Fig. O, Sheet M. C. B. 19, detail Sheet M. C. B. 19-O; or,

Coupler-unlocking rod as end handhold.

(35) The coupler unlocking rod, when properly located and having proper clearance around it under all conditions, including projecting loads, will be a suitable end handhold.

Hopper-car side handholds.

(36) *Hopper cars* to be provided with horizontal or vertical handholds on each side of each car over sill steps, with as much clear length as the car construction will permit, provided handholds need not exceed 16 inches length in the clear.

(37) If horizontal handholds are used, they shall be located not more than 30 inches above center line of coupler.

High cars.

(38) Hopper cars without platform end sills, having ladders located on sides, to have one vertical or horizontal handhold at upper corner of left-hand side of brake end of car;

(39) Vertical handhold to extend downward from about 4 inches from top of car; horizontal handhold located about 6 inches from top of car.

End handholds.

(40) Each end of hopper cars to be provided with two horizontal handholds, not less than 12 inches and preferably 16 inches in the clear or longer, located not over 30 inches above center line of coupler, or placed under the end sill as near the face as will insure a good safe fastening, or, if preferred, may be placed on the face of end sill. The coupler unlocking rod, or a tread of ladder, when properly located and having proper clearance around it, is a suitable end handhold.

Brake-step bracket as handhold.

(41) Exception to be made when the car is provided with a brake step, in which case the bracket of the brake step, if of suitable height, may be used as a handhold on that side of the end of car.

Drawing reference.

(42) Arrangement of handholds is shown on Fig. P, Sheet M. C. B. 19, detail Sheet M. C. B. 19-P.

CABOOSE CARS.

Caboose cars. With platforms.

(43) *Caboose cars* having end platforms, the platform railings and posts will be effective handholds.

Without platforms.

(44) Caboose cars not having end platforms to be equipped with side and end handholds, same as described for box and other house cars.

Side-door handholds and steps.

(45) Caboose cars having side doors, to have vertical handholds on each door post and suitable steps below doorway.

Curved handholds.

(46) Curved hand railings located so as to facilitate catching caboose cars under motion will be considered as suitable handholds.

HANDHOLD AND LADDER TREAD FASTENINGS, DIMENSIONS AND CLEARANCES.

Through bolts.

(1) All handholds and ladder treads applied on wood to be secured by through bolts or lag screws.

Bolt description.

(2) When bolts are used, they should be not less than ½-inch diameter, with nuts on the outside wherever possible and riveted over.

Lag screws.

(3) When lag screws are used, they should be not less than ½-inch diameter, 3 inches long, and screwed full length into the wood.

Rivets.

(4) When rivets are used, they should be not less than ½-inch diameter.

Clearance.

(5) All handholds and ladder treads shall have a minimum clearance around them of 2 inches, nominal clearance 2½ inches.

Material.

(6) All handholds and ladder treads made of wrought iron or steel to be of ⅝-inch nominal diameter or larger.

Coupler-unlocking-rod.

(7) The coupler unlocking rod, if properly located and having a minimum clearance of 2 inches around it will be a suitable end handhold.

Brake-step bracket used as a handhold.

(8) Brake step brackets, if properly located and not more than 30 inches above center line of coupler, will be suitable end handholds.

References.

(9) See Proceedings 1879, pages 109, 110, 111; Proceedings 1893, 1894, 1896, 1902, 1907, 1908.

PASSENGER TRAIN CARS.

Railings as handholds.

(1) *Passenger train cars having open end platforms,* platform steps, and platform railings, the railings will be effective handholds.

Wide-vestibule side handholds.

(2) *Passenger train cars having wide vestibules,* the side door posts to be equipped with vertical handholds of 16 inches clear length or longer.

Wide-vestibule end handholds.

(3) *Passenger train cars having wide vestibules* also to be equipped with end handholds, one on each side of each end of car, with about 16 inches clear length, attached to under side of platform end sill or face of vestibule; but the body of any handhold should not project beyond vestibule face more than one inch.

Non-platform corner handholds.

(4) *Passenger train cars not equipped with platforms* to have at each corner of each car, a vertical handhold of 16 inches clear length or longer.

Steps.

(5) *Passenger train cars with projecting end sills* to have a metal sill step under each corner with tread not higher than 32 inches from the rail.

Hand railing.

(6) *Passenger train cars with projecting end sills* to have end hand railings extending across the ends of the cars, except within end doorways or vestibules, located a suitable height above top of end sills.

End handholds.

(7) *All passenger train cars, excepting open platform cars,* to be equipped with end handholds, one on each side of each end of car, about 16 inches clear length, attached to the end of car on face, or under side of end of car as near the face as will insure a good safe fastening.

Step dimensions.

(8) Metal sill steps on passenger train cars to be not less than ½ by 1½ inches cross sectional area or equivalent, and to be securely fastened to the car.

(9) Handholds on passenger train cars to be made of metal of ⅝-inch nominal diameter, and to be securely fastened to the car. **Handhold dimensions.**

(10) *Passenger train cars without end platforms, but with side doors,* to have vertical handholds and suitable steps below doorway. **Side-door handholds and steps.**

The questions to be determined are:

35. Are you in favor of the adoption as standard of the recommendations as submitted for freight train cars?

36. Are you in favor of the adoption as standard of the recommendations as submitted for caboose cars?

37. Are you in favor of the adoption as standard of the recommendations as submitted for passenger train cars?

RECOMMENDED PRACTICE.

BRAKE SHAFT BOW.

Sheet M. C. B. 19.

The Committee on Revision of Standards and Recommended Practice recommends the adoption as Recommended Practice of a brake-staff bow for new cars, so that the half yoke or carrier-iron extension, now largely used, will not be extended to new cars.

A. Are you in favor of the adoption of a U-shaped carrier iron for brake-shaft bow on new cars as Recommended Practice, instead of the half yoke or carrier-iron extension now largely used?

BRAKE BEAM HANGERS AND PINS.

Page 623, 1907 Proceedings.

As is stated in question No. 10 under the Standards, the question of standard sections of bars for brake beam hangers and pins was considered, and it was decided to submit to letter ballot the adoption of two sizes, one as a Standard and one as a Recommended Practice, the latter dimension to be 1 inch. The question to be determined under this heading is:

B. Are you in favor of the adoption as Recommended Practice the provision that brake beam hangers and pins shall be one inch in diameter?

FROM COMMITTEE ON TESTS OF COUPLERS.

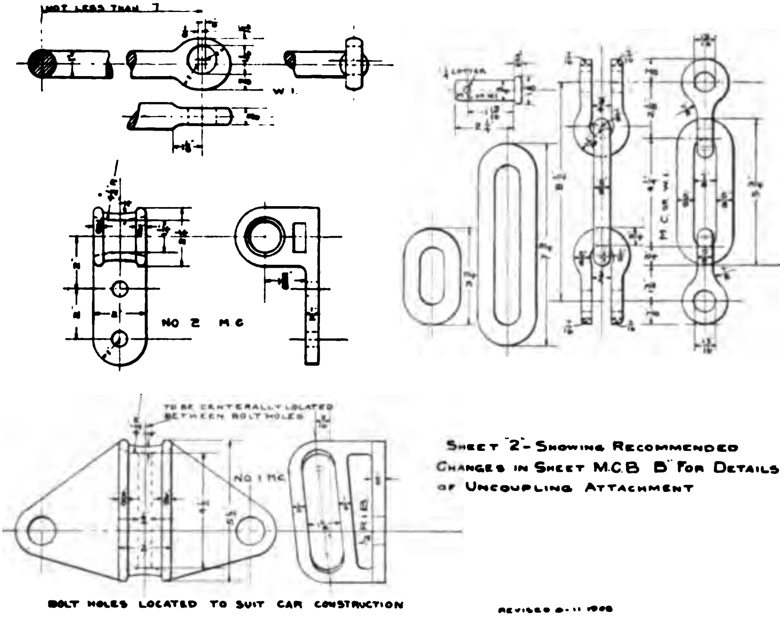
UNCOUPLING ATTACHMENTS.

Sheet M. C. B.— B. Page 597.

The Committee on Tests of Couplers presents designs of uncoupling attachments as shown on Sheets Nos. 1 and 2, herewith, and recommends their adoption in lieu of those shown on Sheet M. C. B.— B; also that the text of the recommended

practice shown on page 597 be changed to conform to the above designs.

C. Do you favor the adoption of these designs and also the change in text?


NOT LESS THAN
W. I.
NO 2 M.C
TO BE CENTERALLY LOCATED BETWEEN BOLT HOLES
NO 1 M.C
M.C.B. W.I.
Sheet "2" – Showing Recommended Changes in Sheet M.C.B "B" For Details of Uncoupling Attachment
BOLT HOLES LOCATED TO SUIT CAR CONSTRUCTION
REVISED 6-11 1908

Sheet No. 2.

RULES FOR LOADING LONG MATERIALS.

Sheets D, D1 and D2.

The Committee on Revision of the Rules for Loading Long Materials made some suggestions as to minor changes in the rules, but as most of them are either typographical corrections or changes in the text to make the meaning clearer these changes will be made before the rules are reprinted. The suggestions which should go to letter ballot are as follows:

Change Rule No. 11 to read:

NEW RULE 11.

The width of overhanging load placed on single cars must never exceed the following dimensions. When all the pieces are of approximately the same length the length of overhang should not exceed eighteen (18) feet, but shipments may contain pieces overhanging as much as twenty-four (24) feet provided the average length of the overhang of the total load does not exceed eighteen (18) feet.

Length of Overhang.	Width of Load.	Length of Overhang.	Width of Load.
C	W	C	W
9 ft. 0 in.	9 ft. 5 in.	18 ft. 0 in.	8 ft. 1 in.
10 " 6 "	9 " 2½ "	19 " 6 "	7 " 0 "
12 " 0 "	9 " 0 "	21 " 0 "	6 " 4 "
13 " 6 "	8 " 9½ "	22 " 6 "	5 " 8 "
15 " 0 "	8 " 7 "	24 " 0 "	5 " 0 "
16 " 6 "	8 " 4 "		

The overhang is measured from center of truck to extreme end of overhang. See Figs. 23 and 24.

D. Are you in favor of this change?

The committee suggested the following additions to Rule 13:

Three-sixteenth-inch diameter wire will be accepted as a substitute throughout the rules, provided the ends are securely twisted.

Two strands or 1 wrapping of 3-16-inch wire will be equivalent to 6 strands (3 wrappings) ⅛-inch diameter wire.

Four strands or 2 wrappings of 3-16-inch wire will be equivalent to 10 strands (5 wrappings) ⅛-inch diameter wire.

E. Are you in favor of these additions?

The committee recommends a new rule, 15-E, as follows:

NEW RULE 15-E.

For twin or triple loads of long flexible material, which require more than two sliding pieces in addition to the bearing pieces, the weight of lading must not exceed one-half the capacity of the car if load consists of plates or similar lading, as per Fig. 43. Structural material of less flexibility, such as heavy channels and "I" beams, must conform to Rules 15-A and 15-B, and should be loaded as per Figs. 41 and 42.

F. Are you in favor of this rule?

In order to insure security of shipment of deep girders, the committee recommends the following general instructions be made a part of the rules, viz., 75-A:

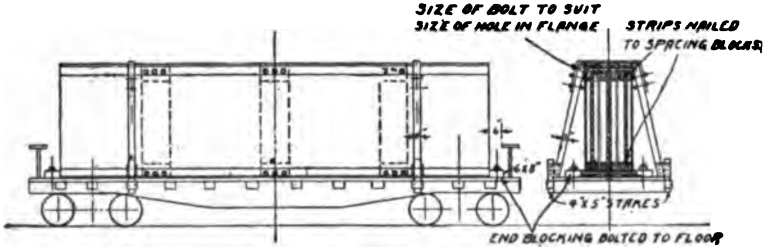
Rule 75-A.

Deep girders, whenever possible, should be loaded horizontally. Girders having a depth of more than two and one-half (2½) times the base, if loaded vertically, must be blocked apart to prevent overlapping of flanges and tied together to prevent independent side motion. See Fig. 31-A. This tying should be sufficiently strong and secure to practically combine all the girders so that they must act as one piece. In addition the load must be carefully blocked to prevent shifting sidewise or endwise.

FIG. 31-A

MANNER OF LOADING DEEP GIRDERS ON FLAT CARS.

RULE 75-A.



G. Are you in favor of this rule?

The committee suggests a revision of Rule 77, as follows:

New Rule 77.

If overhang (C) exceeds one-third (1-3) the total length (L) of load as per Figs. 23 and 24, the opposite end must be securely bolted through bearing-piece to floor by means of seven-eighths (⅞) inch bolts.

H. Are you in favor of this rule?

The committee suggests a revision and addition to Rule 89, as follows:

Rule 89.

When plates are loaded on single cars, except all steel and steel underframe designs, and the lengths of the plates are such that it becomes necessary to lap the plates on each other at the center of the car, they must be braced to prevent shifting sidewise and bearing-pieces not less than six (6) by eight (8) inches in section and in length corresponding to the distance between the sides must be placed on the floor of the car above the cross bearers to prevent the breaking down of center sills and stringers as shown in Figs. 37 and 38. Wooden underframe cars with two truss rods must not be loaded in this manner.

I. Are you in favor of this modified rule?

The committee suggests that the last sentence of Rule 90 be changed to read:

When lading consists of "I" beams or similar material lying flat, and the load is 40,000 pounds or more per bearing piece, or when there is danger of the flanges cutting into the bearing pieces, the webs of such material must be supported by web pieces or the lading must be placed on pivoted bolsters.

J. Are you in favor of this change?

The committee suggests a revision of Rule 98, as follows:

RULE 98.

Rails, bar iron, channels, angles, etc., should, whenever possible, be loaded on single cars inside of end gates, which must in all cases be raised and securely fastened. Rolling freight must be chocked to prevent side and end motion.

K. Are you in favor of this revision?

The committee suggests a new Rule, 98-A, to provide for the loading of pig iron, short billets, etc., as follows:

NEW RULE 98-A.

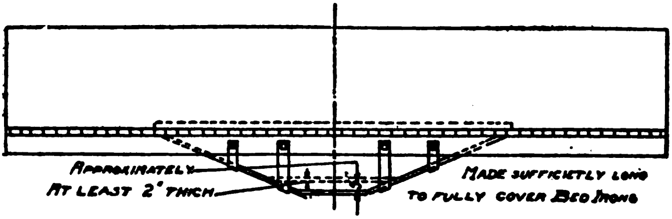
Pig iron, short billets, small castings, and material of similar character, should, as far as practicable, be loaded in flat floor gondola cars, and the door openings need not be boarded over. The lading, however, must be loaded over the bolsters. But, should a few pieces not exceeding one layer in depth shift over doors in transit, be the doors either flush with top of floor or bottom of sills, the shipment will be considered acceptable provided the doors and door mechanism are in good condition. Drop-end gondola cars must have the end gates raised and secured.

When flat cars are selected the lading must have end and side protection, consisting of plank of sufficient height and at least 2 inches in thickness placed against stakes spaced not more than 6 feet apart, and of the required dimensions as per Rule 12.

When hoppers or self-cleaning hoppers are selected the doors must be securely boarded over as per Fig. 45-D.

Fig. 45-D.

DIAGRAM OF HOPPER BOTTOM CAR, SHOWING THE APPLICATION OF FALSE BOTTOM FOR THE LOADING OF PIG IRON BILLETS, SMALL CASTINGS ETC.

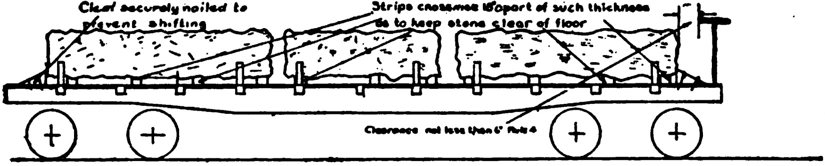


L. Are you in favor of this new rule?

Under the heading of "Rules Governing the Loading of Stone," the committee suggests a reconstruction of Rules 118, 119 and 120, to make them clearer to inspectors, and at the same time cover a larger variety of loads offered for shipment, as follows:

RULE 118. Small stone, such as rip-rap, spawls, paving blocks, brick, tiling, etc., should be loaded in gondola cars. The lading may be loaded over drop doors, not boarded over, provided the doors and door mechanism are in good condition.

Fig 62.


Cleat securely nailed to prevent shifting
Strips crosswise 1" apart of such thickness as to keep stone clear of floor
Clearance not less than 6" Rule 4

See Rule 120.

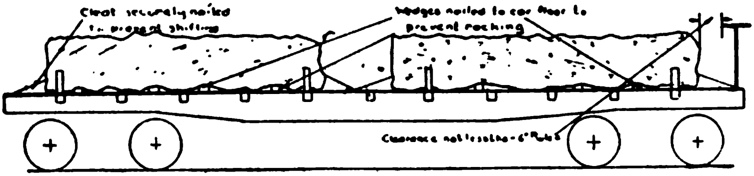
M. Do you favor this revision?

RULE 119. Flagging, dressed or sawed stone, such as building granite, marble and similar stone, should be loaded in gondola cars, and must rest on two or more softwood strips of sufficient thickness, placed flat and crosswise of car, to keep stone clear of floor.

If loaded on flat cars in piles not over thirty (30) inches in height, the lading must, in addition to prescribed stripping, have side and end protection consisting of hardwood plank or cross braces of at least 1-inch thickness nailed against inner side of stakes to the height of lading. When the lading is over thirty (30) inches in height the same precaution must be taken with reference to end and side protection, but stakes must extend at least four (4) inches above lading and tops of opposite stakes must be wired together with two wrappings, equal to four strands of good ⅛-inch diameter wire. Stakes must be spaced not more than 4 feet apart, and of the required dimensions as per Rule 12.

If flat cars are used for the shipment of sawed stone, such as trimmings, copings, etc., used for building purposes, the longer lengths should be placed to the outside of the lading and the shorter lengths placed inside.

Fig 63.


Cleat securely nailed to prevent shifting
Wedges nailed to car floor to prevent rocking
Clearance not less than 6" Rule 5

See Rule 120.

N. Do you favor this change?

RULE 120. Large flagging, block, breakwater or grindstones, with approximately straight as well as those with uneven faces must be loaded in cars with substantial side and end protection, must be well chocked and wedged to prevent shifting and rocking, and must rest on wood strips of sufficient thickness placed crosswise of car to keep stone clear of floor as provided in Rule 119.

If loaded on flat cars, the lading must, in addition to the prescribed stripping, be secured with hardwood stakes or cleats, to prevent side and end shifting, as per Rules 12 and 119, Figs. 62 and 63.

O. Do you favor this change?

The committee recommends the following substitute for Rule 121:

NEW RULE 121.

RULES GOVERNING THE LOADING OF CYLINDRICAL BOILER SHELLS AND TANKS.

Lading of this description eight (8) feet or less in diameter, when loaded on single flat or gondola cars, should be substantially staked and chocked with blocking in height equal to one-seventh (1-7) the diameter of the shell. When the cylinder or shell is more than eight (8) feet in diameter the same precaution should be taken with reference to staking and blocking, and in addition to that it should be secured with two bands of not less than three-quarter (¾) inch round iron or flat bands of equal section.

When such lading is placed upon two or more cars as a tandem shipment it should be secured with two bands of not less than seven-eighths (⅞) inch round iron or flat bands of equal section in addition to the prescribed blocking.

P. Are you in favor of the substitution of this rule?

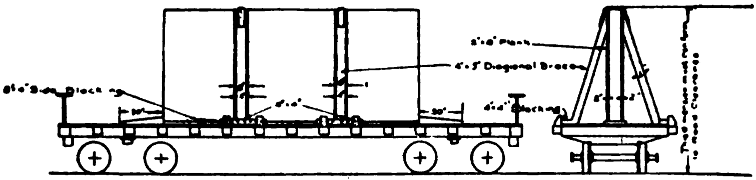
It is recommended that the following rule for loading plate glass be added:

New Rule 122.

Large pieces of plate glass carried on flat cars should be loaded vertically, if practicable, and substantially secured by cleats on the floor, end and side braces as provided for in Fig. 64.

Fig. 64.

Lading of Plate Glass on Flat Cars



Q. Are you in favor of this new rule?

The committee recommends the addition of the following, Rule 123:

New Rule 123.

Cars with racks, when loaded with material such as scrap junk, should have the space between the slats sufficiently sealed to prevent loss of material, or ends of pieces working through, and the top of load should be securely tied down with a sufficient number of strands of good one-eighth (⅛) inch diameter wire to prevent any of the lading from rolling off.

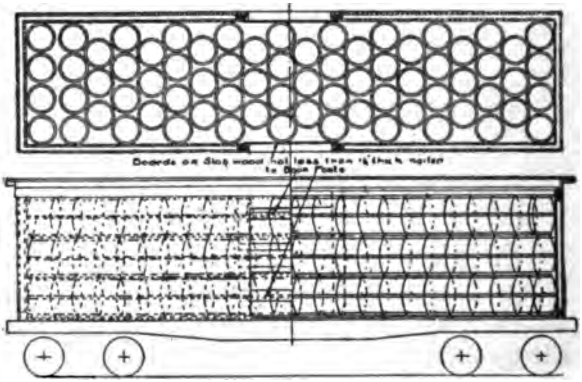
R. Are you in favor of this rule?

The committee recommended certain rules for loading long materials in box or stock cars where the opportunity is provided for inspection, and on motion they were referred to letter ballot to decide whether they should be made a part of the Rules for Loading Long Materials. They are as follows:

RULES FOR LOADING MATERIAL IN BOX OR STOCK CARS WHERE THE OPPORTUNITY IS PROVIDED FOR INSPECTION.

RULE 124. Barrels should be loaded in accordance with Fig. 67. If the barrels do not fully fill the space they should be chocked, to prevent sliding and rolling.

Fig. 67.


Boards or Slab wood not less than 4" thick nailed to Door Posts

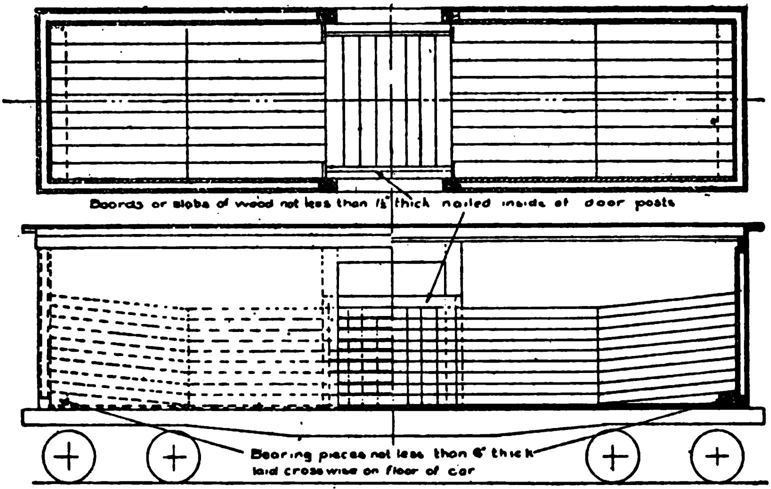
Manner of Loading Barrels in Box or Stock Cars.

RULE 125. Barrel staves, ties, fence posts, wooden billets and similar short wood should be loaded in accordance with Fig. 68. Good, sound pieces of lumber spaced not more than 2½ inches apart should be used across door openings.

RULE 126. Tires must be loaded in piles, each pile consisting of tires laid on top of each other, and inclined tires tipped against those lying flat, keying them in place as per Fig. 69.

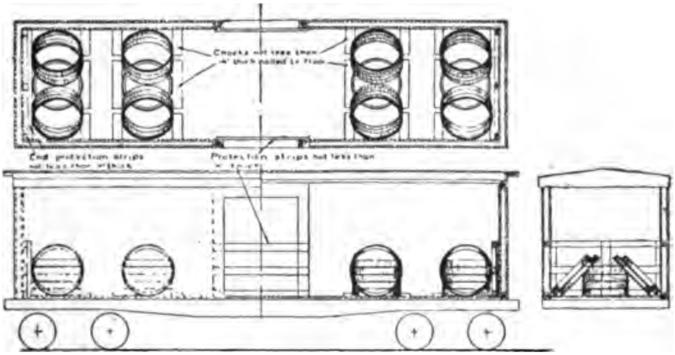
The bottom tire of each pile must be chocked to prevent sliding. The ends of car must be protected by boards or slab wood, not less than four inches thick, extending from side to side of car and spaced not less than four inches from end sheathing by vertical pieces to which the protection strips must be secured. The door openings must be protected by means of strips not less than four inches thick nailed to inside of door posts.

Fig. 68.


Boards or slabs of wood not less than 1½" thick nailed inside of door posts
Bearing pieces not less than 6" thick laid crosswise on floor of car

Manner of Loading Ties, Fence Posts, Wooden Billets, Barrel Staves and Similar Short Wood in Closed Cars.

Fig. 69.



Manner of Loading Tires in Box or Stock Cars.

Rule 127. Car wheels should be loaded as per Fig. 70. At end of car the wheels should be laid flat, then two rows one on each side of car, touching side lining and inclining toward center of car should rest against those loaded flat. The space between the two rows must be blocked apart, either by wheels placed longitudinally or by means of chocks. Chocks not less than four inches thick should be used to block the wheels nearest center of car, and door openings must be protected by strips not less than three inches thick nailed to inside of door posts.

Fig. 70.

MANNER OF LOADING WHEELS IN CLOSED CARS

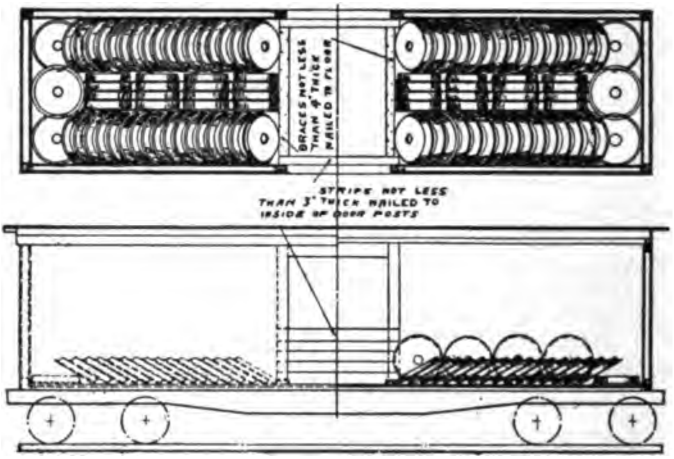
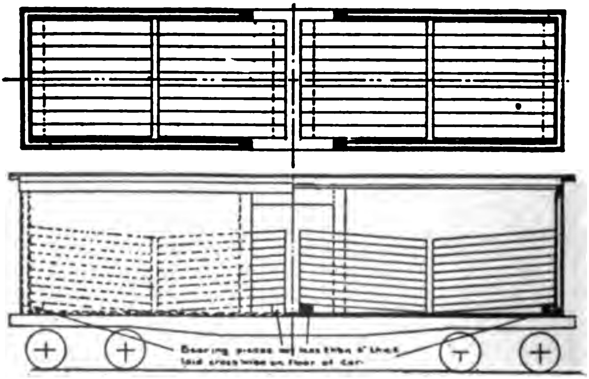

BRACES NOT LESS THAN 4" THICK NAILED TO FLOOR
STRIPS NOT LESS THAN 3" THICK NAILED TO INSIDE OF DOOR POSTS

Fig. 71.

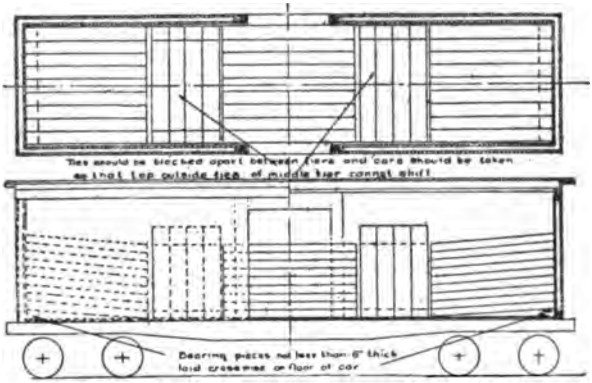

Bearing pieces not less than 4" thick laid crosswise on floor of car

Manner of Loading Four Piles of Ties in Closed Cars.

Rule 128. Ties, fence posts, wood billets, cord wood, lath, tan bark and similar material when loaded in closed cars, must be loaded longitudinally, except at door openings, where it must be placed crosswise to the full width of car if the length of pieces will permit. If the pieces are tapered they must be loaded with tops and butts alternating. The crosswise tiers should incline toward the center of car and the ends of longitudinal tiers nearest the end of car must be raised resting on pieces not less than six inches thick laid crosswise on floor of car. Boards or slab wood not less than one and one-half inches thick must be nailed inside of door posts to full height of load, to prevent load from coming in contact with door. See Fig. 71.

Rule 129. Ties eight feet or more in length, or similar material which can not conform to Rule 128, may be loaded longitudinally in four tiers as per Fig. 71, in which case the ends of the tiers projecting into the doorway must be raised and rest on pieces not less than six inches thick laid crosswise on floor of car. If the length of car is such that ties can not be piled in four tiers, three tiers may be used as shown in Fig. 72, in which case the spaces between the tiers must be blocked to prevent end shifting of the middle tier. When loaded in three or four tiers, as indicated, the protection strips need not be applied.

Fig. 72.


Ties should be blocked apart between tiers and care should be taken so that top outside ties of middle tier cannot shift
Bearing pieces not less than 6" thick laid crosswise on floor of car

Manner of Loading Three Piles of Ties in Closed Cars.

Rule 130. For all other lading which would roll or easily slide, unless otherwise specified, when doorways are partly or entirely open, or when they are covered with ventilated or screen doors, slats six inches wide by one inch thick, or their equivalent, or slab wood not less than one and one-half inches thick at the center, must be nailed to inside of door posts and must be spaced sufficiently close to floor of car and to each other to positively prevent any of the lading from passing between them.

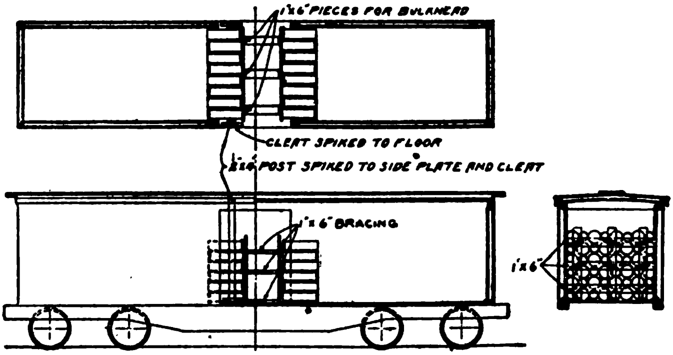
Rule 131. Cars equipped with protection slats nailed to outside of door posts or to door will not be accepted.

Rule 132. Material such as scrap junk when loaded in stock cars must have the spaces between the slats sufficiently sealed to prevent loss of material or ends of material working out through the spaces.

RULE 133. Sewer pipe, drain tile, etc., in closed cars should be loaded in tiers, separated by lath or similar material. The space between the tiers at door opening should be braced as per Fig. 73. When one-half or more of one length of pipe extends beyond door opening such tier must be protected on each side by means of sound wood two inches by four inches in section nailed to inside of plate and secured at floor by means of cleats spiked to floor of car. If full length of pipe extends beyond door openings, such tier must be protected by two pieces of two inch by four inch sound wood on each side, secured as specified above for single piece on each side.

Fig. 73.

MANNER OF LOADING SEWER PIPE IN CLOSED CARS.


1"x6" PIECES FOR BULKHEAD
CLEAT SPIKED TO FLOOR
2"x4" POST SPIKED TO SIDE PLATE AND CLEAT
1"x6" BRACING
1"x6"

S. The question to be determined is, are you in favor of incorporating these rules as a part of the rules for loading long materials?

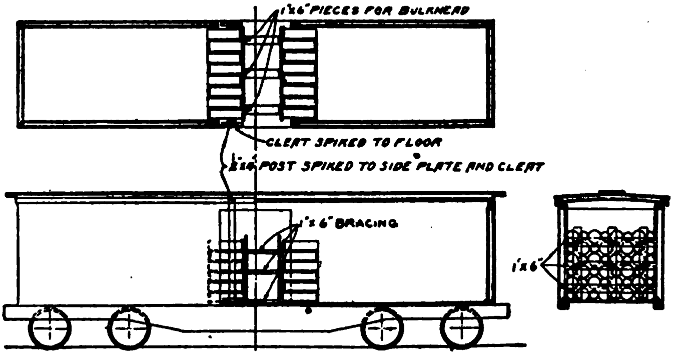
The question was raised as to whether the Rules for Loading Long Materials, as revised, should be advanced from Recommended Practice to Standard.

T. Are you in favor of advancing these rules to a Standard of the Association?

RULE 133. Sewer pipe, drain tile, etc., in closed cars should be loaded in tiers, separated by lath or similar material. The space between the tiers at door opening should be braced as per Fig. 73. When one-half or more of one length of pipe extends beyond door opening such tier must be protected on each side by means of sound wood two inches by four inches in section nailed to inside of plate and secured at floor by means of cleats spiked to floor of car. If full length of pipe extends beyond door openings, such tier must be protected by two pieces of two inch by four inch sound wood on each side, secured as specified above for single piece on each side.

Fig. 73.

MANNER OF LOADING SEWER PIPE IN CLOSED CARS.


1"x6" PIECES FOR BULKHEAD
CLEAT SPIKED TO FLOOR
2x4 POST SPIKED TO SIDE PLATE AND CLEAT
1"x6" BRACING
1"x6"

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The question was raised as to whether the Rules for Loading Long Materials, as revised, should be advanced from Recommended Practice to Standard.

T. Are you in favor of advancing these rules to a Standard of the Association?

JOURNAL BOX FOR PASSENGER CARS.

5 BY 9-INCH JOURNAL.

Sheet M. C. B.—C. Page 609.

The committee appointed on the above subject submitted a drawing, attached hereto, showing revisions which were deemed advisable and asked the adoption of the proposed box, the various proposed changes to be voted on separately, as follows:

Change of width to 9 inches; 8 inches inside of walls.

U. Are you in favor of this change?

Change of outside dust guard wall opening, using 3¾ inches radius on top with center ¼ inch above center line and 3¾ inches radius below from center line, which includes increase of dust guard slot to 9⅛ inches wide.

V. Are you in favor of this change?

Change of inside dust guard wall opening, using a height of 4⅛ inches above center line with 2-inch radii at upper corners; 3½ inches radius below with center ¼ inch below center line.

W. Do you favor this change?

Addition of recess ⅛ inch wide, ⅜ inch deep at top of dust guard opening for dust guard wedge.

X. Do you favor this change?

Change of width of central lugs and location of wedge stop to conform to the 5 by 9-inch freight car box.

Y. Do you favor this change?

Change of equalizer fit on top of box from 3½ inches to 4 inches.

Z. Do you favor this change?

Increase of width of front and back flanges on boxes to 1⅞ inches, for additional wearing surface against pedestal.

AA. Are you in favor of this increase?

PASSENGER CAR PEDESTAL.

JOURNAL 5 BY 9 INCHES.

Sheet M. C. B.— E. Page 609.

The committee on the above subject submitted revised drawing (shown herewith) of pedestal for 5 by 9-inch boxes, which, on motion, was ordered submitted to letter ballot for adoption.

BB. Are you in favor of this revised pedestal?

MARKING OF FREIGHT EQUIPMENT CARS.

Sheet M. C. B.— A. Pages 579 and 595 Proceedings.

The committee on the above subject recommends that the present practice, shown on page 596, for marking fast freight line cars be omitted.

CC. Are you in favor of this recommendation?

That the following specifications be added:

MARKING ON FREIGHT EQUIPMENT CARS.

1. Freight Equipment Cars that have a superstructure which will permit should be stenciled with markings on sides of car, in the following order:

Lettering (Initials or Name of Road),
Number,
Capacity,
Light Weight.

This marking is to be located as nearly over the truck as the lettering will permit, preferably to the left of center line of side of car. On box and other house cars where doors slide to the left, the above marking may be placed to the right of center line of side of car. On any other cars where the construction makes it necessary, this marking may be placed either to the right of center line of side of car, or in the center of side of car. The distance from the center line of coupler to the bottom of car number to be normally 2 feet 4½ inches, with a minimum dimension of

Increase of width of front and back flanges on boxes to 1⅞ inches, for additional wearing surface against pedestal.

AA. Are you in favor of this increase?

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BB. Are you in favor of this revised pedestal?

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CC. Are you in favor of this recommendation?

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This marking is to be located as nearly over the truck as the lettering will permit, preferably to the left of center line of side of car. On box and other house cars where doors slide to the left, the above marking may be placed to the right of center line of side of car. On any other cars where the construction makes it necessary, this marking may be placed either to the right of center line of side of car, or in the center of side of car. The distance from the center line of coupler to the bottom of car number to be normally 2 feet 4½ inches, with a minimum dimension of

1 foot 10½ inches, and a maximum of 2 feet 10½ inches. The spacing of the remaining marking to be as shown on diagram.

2. The ends to show the initials or name of road, car number and light weight, in the upper half of end of car. On box or other house cars having end doors this lettering should be so located that it will not be obscured when doors are open.

3. Flat and low-sided gondola cars should show the lettering (initials or name of road), number, capacity and light weight on the side of car in the best available location offered by the construction of the car. Suggestions as to the arrangement of this lettering are shown on the diagrams. When possible the sizes of lettering and figures should correspond with present Recommended Practice. The end marking on flat cars may be omitted.

4. Side and end doors should be stenciled with the initials or name of road either on the outside or inside of door. If placed on the inside the stenciling should be so located that it will not be defaced by the sliding of the door.

Drawings showing the proposed marking are, herewith, submitted.

DD. Are you in favor of the adoption of these specifications?

TANK CARS.

Pages 615-623, Proceedings 1907.

The committee on the above subject submitted a revision of the specifications for tank cars adopted in 1907. On motion, the specifications, as revised, were ordered submitted to letter ballot for adoption as Recommended Practice, it being understood that the axle requirements and stenciling light weights should be voted on separately. The specifications with the exceptions noted, are as follows:

TANK CARS.

In 1903 a report was submitted embodying certain specifications for the repairs of old equipment and the construction of new equipment. These specifications were submitted to letter ballot and adopted as a Recommended Practice.

In 1906 these specifications were modified; also, in 1907.

The modified specifications are as follows:

TANK CARS.

Requirements for Tank Cars.

Tank cars offered for movement over the lines of a railroad must conform to the following general and detail specifications:

Damage by Fire.— Tanks which bear evidence of damage by fire must be withdrawn from transportation service.

Trucks Size of Axles.— Each truck must have a strength equal to or greater than the strength of the axles used.

Sizes of axles must conform to rule relating to axles in M. C. B. Rules of Interchange for Freight Cars which have been modified as below to make them applicable to tank cars.

All tank cars to have Limit Weight I or Limit Weight II stenciled on them.

Axles.— New steel underframe tank cars built hereafter must have axles to meet requirements of Table No. 2 and car stenciled Limit Weight No. II.

Existing tank cars built prior to this date must have axles to at least meet requirements of Table No. 1, and preferably Table No. 2; and be stenciled "Light Weight I" if the axles conform to Table No. 1; or "Light Weight II" if the axles conform to Table No. 2. When all the axles under any car are changed to meet the requirements of Table No. 2, the stenciling must be changed from "Limit Weight I" to Limit Weight II, to protect the tank car owner when renewals of wheels or axles are made in repairs.

Brakes.— Each car must be equipped with air brakes of a capacity equal to not less than seventy per cent of the light weight of car, and at least one hand brake operating the brakes on both trucks.

Safety Appliances.— Each end of car must be provided with the necessary steps, grabirons, etc., to comply with the requirements of the M. C. B. Association. Each tank car must be provided with substantial and adequate hand railing securely fastened and applied, as shown in the Standards of the M. C. B. Association. Where, from the construction of a car, a side hand railing is inadmissible and therefore involves an overhead running-board and high brake staff, each end of car must be provided with ladders to comply with the requirements of the M. C. B. Association.

Push-Pole Pockets.— There shall be a push-pole pocket at every corner of the car. Where, from the construction of the car, the push-pole pockets can not well be placed on the body, they must be applied to the trucks, so placed above the journal boxes that the push pole will push toward the center of the truck.

Dome Yokes, Tank Straps, Etc.— Tanks must be secured from turning on the underframes, either by center anchors riveted to the tank and underframe, or by means of dome yokes, and must also be secured to underframe by means of tank straps, two for tanks not more than 76 inches in diameter, and four for tanks of greater diameter. The center anchors may be made of two parts, sliding into each other, one riveted to the tank and one to the underframe. The sectional area of dome yokes and tank bands must at no place be less than three-quarters of a square inch, or 1 inch round iron upset to 1⅛ inches at threaded end. Cars having no underframe, with tank securely riveted to body bolsters, do not require dome yokes or tank bands.

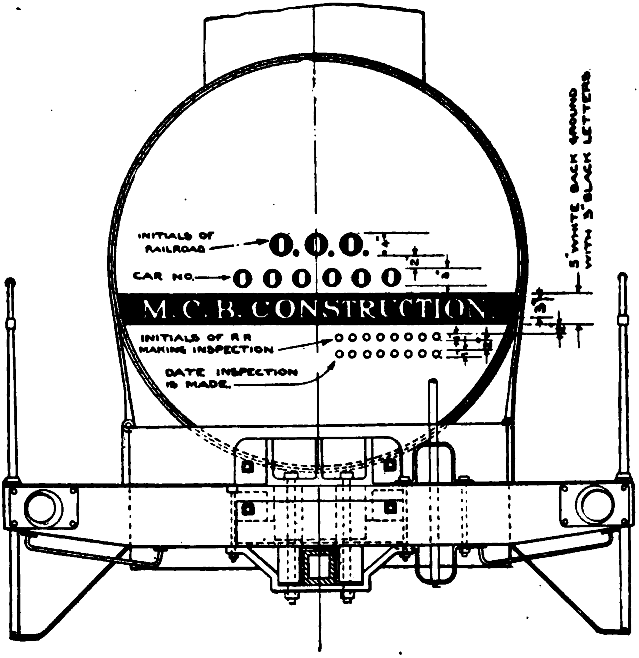
Explanation: A threaded end is 1⅛ inches in diameter or more, with a body consisting of a flat band 2 by ⅜ inches or equivalent section, or round iron 1 inch in diameter will be accepted as meeting the requirements.

The dome yoke proper which passes around the dome may be a rod ¾ inch in diameter, or its equivalent, to which is secured the strap or rod which is fastened to the underframe. The sectional area of dome yoke strap must be the same as required for tank straps.

Where tanks are equipped with a greater number of tank bands than called for, the total sectional area of all bands will be considered as meeting the requirements if they equal the total sectional area of the rods specified.

Existing tank cars, which have the required number of tank bands and dome yokes, but where the 1-inch rod fastening the tank band to the underframe is not upset for the threaded portion to 1⅛ inches, will be accepted until such time that the cars go to the shop for repairs, when the threaded portion of such bands must be changed to 1⅛ inches or 1⅛-inch rods used.

TEST.— Tanks must be carefully inspected and tested with cold water pressure at least once in ten years. The test for new tanks should be at sixty pounds per square inch and for old tanks at forty pounds per square



inch, which they must stand without serious leak or evidence of distress. This inspection and test must be made by the tank-car owners, and all tanks must be so tested by January 1, 1908. Tanks, when tested, must be stenciled with date and place where test was made, and by whom, as follows:

Tested (Date) ....
Pressure (Pounds per square inch)....................
At (Place) ....
By (Name of Firm)....................................

New Tanks.— New steel or iron tanks must be designed for a bursting pressure of not less than 240 pounds per square inch.

Inspection.— All tank cars at home on a railroad must be inspected by inspectors in the employ of that railroad company, and when such tank cars meet the requirements herein set forth, the legend shown below must be stenciled by the inspector on both tank heads, with the initials of the railroad company making such inspection and the date the inspection is made. If foreign tank cars and individual tank cars at home on foreign lines stenciled with the legend "M. C. B. Construction" by a foreign road are offered for movement over another railroad and some of the details do not conform to the requirements of the tank-car circular, a report of same should be made through the proper officers to the official in charge of equipment and the car allowed to proceed until further notice.

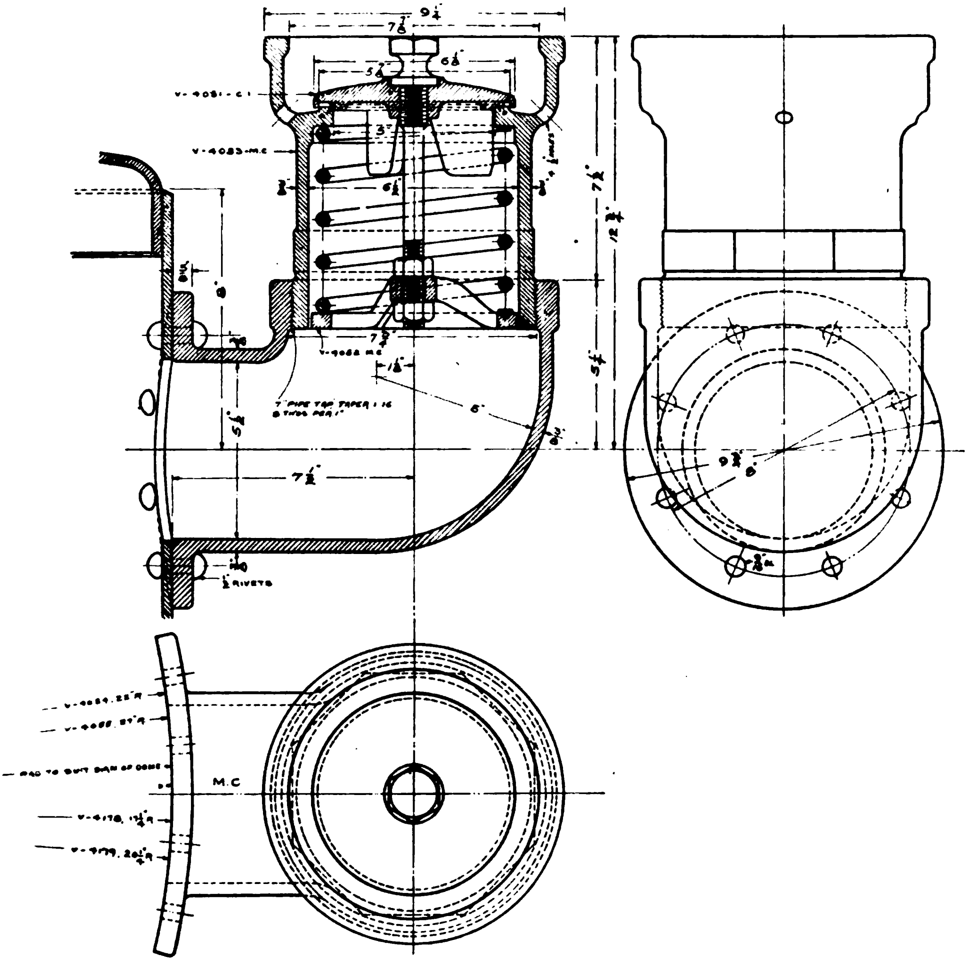
APPLICATION OF SAFETY VALVES.

Five-inch Safety Valves.— All tanks carrying volatile or inflammable material, such as crude petroleum, fuel oil, benzine, naphtha, kerosene, illuminating oils, petroleum products, turpentine, etc., must be equipped with five-inch safety valves of the recommended design; one valve for capacity of 6,500 gallons or less, and two valves for a capacity of more than 6,500 gallons. Where tank cars carrying such products are subdivided into compartments, each compartment must be provided with a safety valve. Where only one valve is used, it must be set to open at a pressure of eight pounds per square inch; where two valves are used, only one must be set to open at a pressure of eight pounds per square inch, and the other at twelve pounds per square inch.

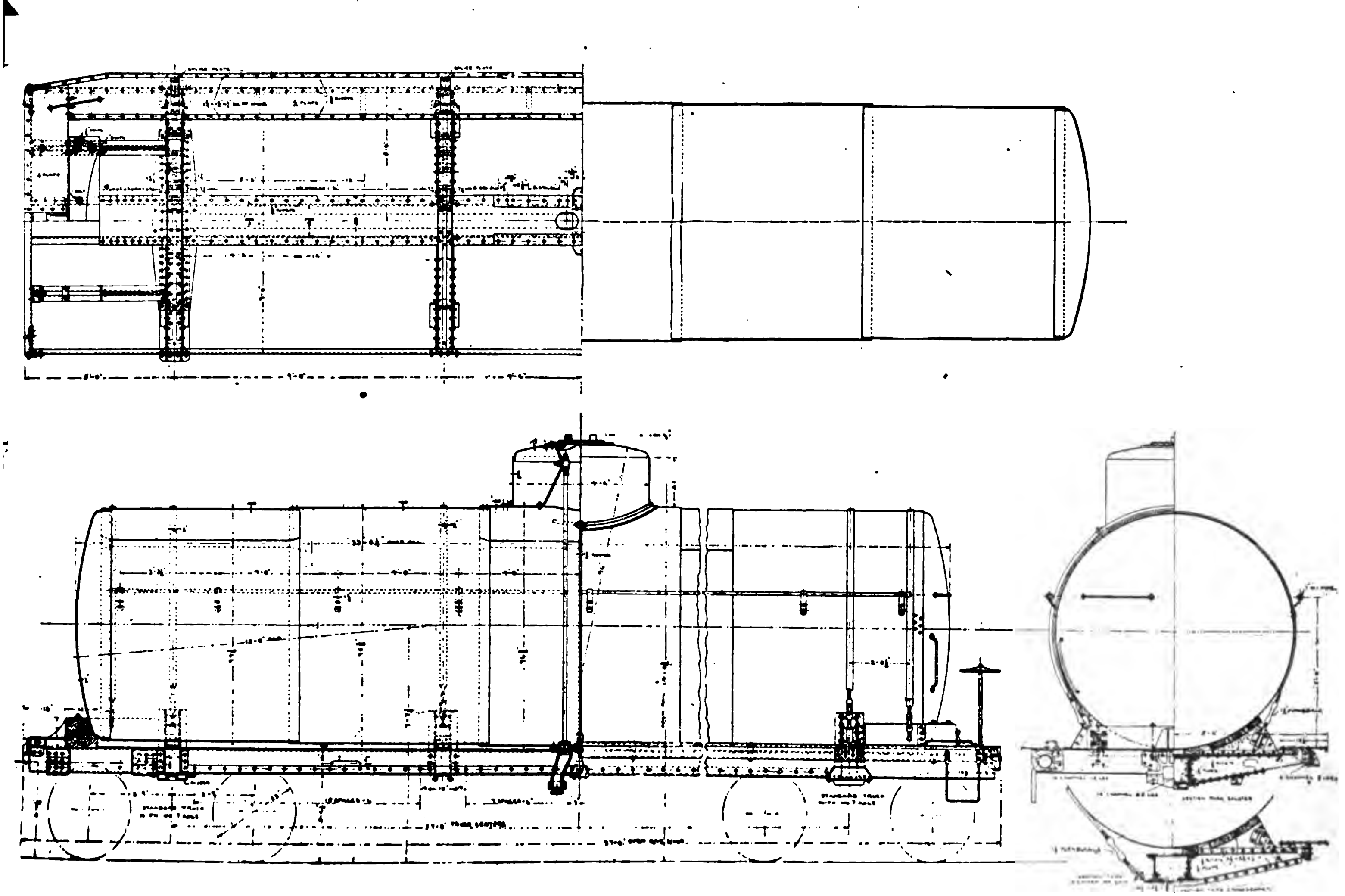
Safety Vents with Lead Disks.— Tank cars carrying volatile, non-inflammable products, such as gas liquor, ammonia liquor, etc., where the prevention of evaporation is essential, may be provided with vents depending on frangible lead disks for safety, which vents shall be of recommended design, as shown by cut below, the disks to be of a thickness that shall insure rupture at pressure not higher than twenty-five pounds per square inch.

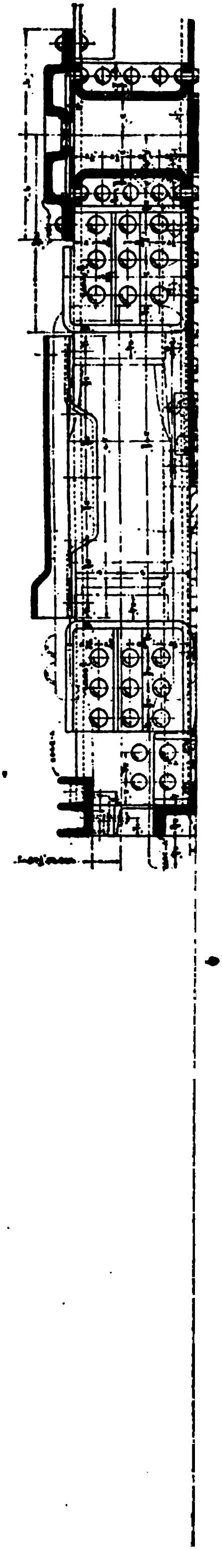
Vent Hole or Small Valve.— Tank cars carrying non-inflammable or non-volatile material, such as sulphuric acid, vinegar, linseed oil, cottonseed oil, lard oil, fish oil, tannery products, glucose, molasses, calcium chloride, caustic soda, silicate of soda, etc., need not be provided with five-

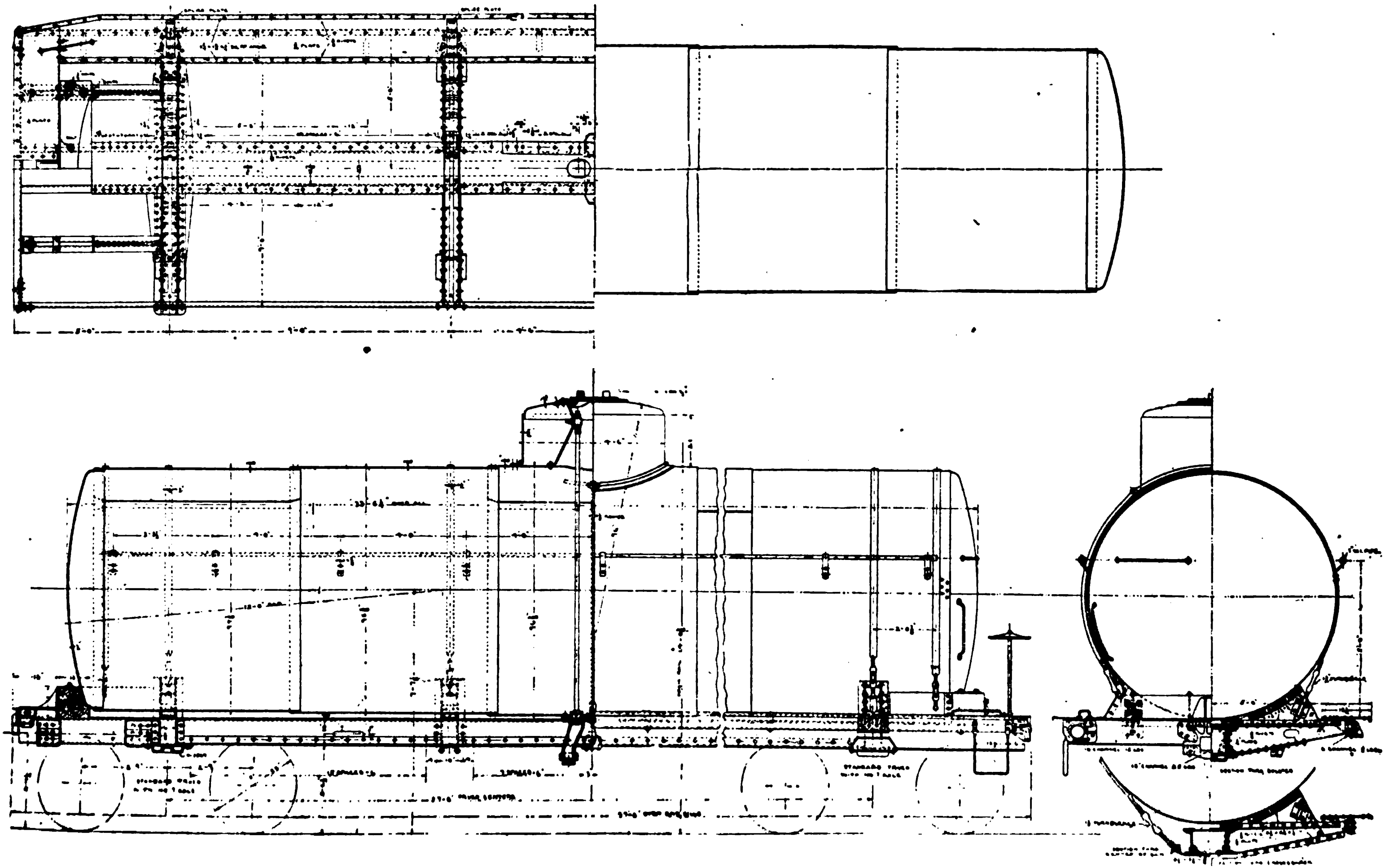
inch safety valves, but each tank must have a small open vent or valve, equal to not less than 2 inches in diameter.

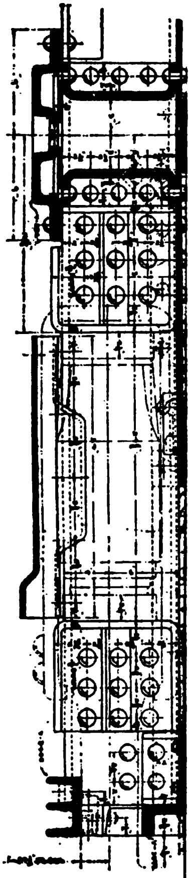


In the case of such liquids as coal tar, containing volatile products where it is essential to avoid the escape of the vapor, either the frangible lead disk or standard safety valve may be used, otherwise one or more open vents equal in area to an opening of not less than two inches in diameter will be acceptable.









timbers not less in depth than center sills, extending from end sill to the center of nearest cross-bearer or cross-timber, provided the latter is located not less than 4 feet 6 inches from center of bolster. On cars where the draft arrangement is between center sills, the filler timber must be extended to the cross-tie timber when the cars go to shop for repairs to center sills. Center sills and filling timbers must be securely bolted together by means of ¾-inch bolts. On cars having center or intermediate sills not less than 10 inches wide by 10 inches deep, which may be made up of two 5 by 10 inch sills, bolted together, the filling timbers may be omitted.

End Sills.— End sills not reinforced by buffer blocks must not be less than 9 inches wide by 10 inches deep. End sills 6 inches wide by 12 inches deep, reinforced with buffer blocks not less than 6 inches wide by 10 inches deep and of sufficient length to overlap center sills, will be acceptable as a substitute for 9 by 10-inch end sills.

On existing cars, if buffer blocks are used for the purpose of reinforcing end sills which do not come within the specified requirements, the buffer blocks in no case must be less than 4 inches thick nor end sill less than 6 inches thick. The total strength of the end sill and buffer block must be equal to the strength of the construction specified.

Draft Timbers.— Draft timbers secured to inside of center sills and extending to cross-bearer or cross-timber will be accepted as a substitute for filling timbers referred to above. Where center sills are 9 inches wide by 10 inches deep, or over, and draft timbers are placed between same, they need not extend farther back than body bolster, provided they are adequately secured to center sills by means of seven ⅞-inch bolts or their equivalent, and butt against body bolster. Draft timbers located underneath the center sills must not be less than 4 inches wide by 8 inches deep, and each draft timber must be held to center sills, end sills and buffer block by means of seven or more ⅞-inch bolts, or six 1-inch bolts. Where an arrangement for supporting draft timbers is substituted for one or more bolts and the construction is of equal strength, the same will be acceptable. Draft timbers extending beyond bolster must be secured to center sills by additional bolts.

Draft Gear.— The draft gear and draft attachments must be at least as strong as the design shown in Fig. 1.

Cars should be provided with draft gear stops gained into draft timbers or heeled on end sills, filler timber or body bolster, and secured with five ¾-inch bolts; but cars having stops gained into draft timbers or heeled on end sill, filler timber or body bolster secured with three ¾-inch bolts may be continued in service until such time as they go to shop for repairs, when five bolt stops must be provided.

In all cases, tail yokes or attachments of equal strength must be used. Tail bolts, tail straps or American continuous draft gear will not be accepted.

Head Blocks.— Head blocks must not be less than 10 inches wide unless reinforced by metal plates, and of sufficient depth to extend at least 6 inches above bottom of tank, and may be made of two pieces bolted together and bolted to underframe by means of not less than four ⅞-inch vertical bolts. They must be cut out to suit curve of tank. The ends of each head block should, preferably, be tied to corresponding end of head block at the other end of the car by means of rods not less than 1 inch in diameter, with 1⅛-inch threaded ends, and each head block supported at center by means of a substantial casting securely bolted to end and center sills. Where the construction of the car does not permit of this fastening, the following may be substituted:

The ends of each head block tied to corresponding end of head block at the other end of car by rods not less than 1 inch in diameter, with 1⅛-inch threaded ends, and each head block secured by two stay rods 1 inch in diameter anchored to center sills;

Or, head block supported at center by means of a substantial casting securely bolted to end and center sills and two 1-inch rods passing diagonally through head block toward bolster and secured to underframe;

Or, head block secured by two stay rods 1⅜ inches in diameter anchored to center sills;

Or, head block secured by two stay rods 1 inch in diameter anchored to center sills and two 1-inch rods passing diagonally through head block toward bolster and secured to underframe;

Or, head block secured by two stay rods 1 inch in diameter anchored to center sills and two straps not less than ¾ inch thick and 3 inches wide passing over head blocks and securely fastened to underframe.

Dome Heads and Covers.— Where tank cars are fitted with cast-iron dome heads and covers not sufficiently strong to stand the necessary 40 pounds hydraulic test, they must be replaced by others of cast or pressed steel, or of malleable iron.

Tank Heads.— Tank heads less than 7-16 of an inch thick bearing evidence of damage from impact with head blocks, should be reinforced at bottom by means of steel plate shoes ⅜ inch thick, riveted to head and shell.

NEW TANK CARS.

No tank cars built hereafter shall be accepted for transportation unless equipped with steel underframing or with reinforced shell. The design and construction of the car throughout must be at least as strong as that shown in attached Figs. 2 and 3.

New tank cars must conform to the general specifications given in the foregoing in addition to the following detailed specifications:

Center Sills.— The center sill construction of the underframe between bolsters must have a sectional area of at least thirty square inches.

Bolsters; Draft Gear.— Each car must be equipped with steel body and truck bolsters, steel couplers and a draft gear of approved design, having a capacity of at least 60,000 pounds. Tail bolts or straps must not be used.

TANK SEAMS.— All longitudinal and head seams must be double riveted. Where head blocks are not used, head seams need not be double riveted.

CARS WITHOUT UNDERFRAMES.— If the car has no underframe, the tank shell at bottom must be at least ⅝ inch thick, and all circumferential seams in bottom sheet except head seams must be double riveted. The sectional area of the additional metal in bottom of tank shell must be at least 20 square inches.

LONGITUDINAL ANCHORAGE.— Particular attention must be given to the longitudinal anchorage of the tank, which must be thoroughly substantial, to prevent end shifting.

Steel underframe tank cars must have a longitudinal clearance for tank valve extension of not less than 2½ inches on each side of valve.

Wooden underframe tank cars must have as much longitudinal clearance for tank valve extension as the construction will permit, with a minimum of six inches on each side.

DOME HEADS AND COVERS.— Dome heads and covers must be made of either cast or pressed steel or of malleable iron.

EE. Are you in favor of the above modified specifications?

During the discussion of the report on tank cars made at the 1907 convention, it developed that there might be objections from a traffic schedule standpoint to light weight and capacity markings, and that a maximum weight was necessary to enable inspectors to determine the strength of axles and other parts of truck. A further canvas of the subject develops that there are no objections from a traffic view to stenciling tank cars "limit weight," which will afford inspectors all the necessary information from a safety standpoint and will have no bearing on the traffic question of how much is lading and how much is car. The committee therefore suggests that tank cars be stenciled with limit weights instead of capacity, and that the axle requirements as given in Tables I and II, below, be adopted as Recommended Practice:

TABLE I.

FOR TANK CARS MARKED LIMIT WEIGHT I.

Limit Weight I in lbs.	Journal.	Wheel Seat.	Center.
161,000	5 inches	6¾ inches	5⅞ inches
132,000	4½ “	6¼ “	5 5-16 “
112,000	4 “	5⅝ “	4⅞ “
95,000	3¾ “	5 “	4⅜ “
79,000	3½ “	4¾ “	4⅛ “
66,000	3¼ “	4⅝ “	3⅞ “
58,000	3 “	4¼ “	3½ “

TABLE II.

FOR TANK CARS MARKED LIMIT WEIGHT II.

Limit Weight II in lbs.	Journal.	Wheel Seat.	Center.
161,000	5 inches	6¾ inches	5⅞ inches
132,000	4½ “	6¼ “	5⅜ “
112,000	4¼ “	6 “	5¼ “
95,000	3¾ “	5½ “	4¾ “
79,000	3½ “	5¼ “	4⅝ “
66,000	3¼ “	4⅞ “	4¼ “
58,000	3 ”	4¾ “	4⅛ “

The questions to be determined are:

FF. Are you in favor of the marking of tank cars with limit weight?

GG. Are you in favor of the adoption of the axle requirements, given in Tables I and II, which correspond with the limits given in Rule 23, M. C. B. Rules of Interchange, with the exception that Limit Weight I has been substituted for Capacity of Car in Table No. I, and Limit Weight II has been substituted in Table No. I for Maximum Weight, as Recommended Practice?

JOSEPH W. TAYLOR,
Secretary.

LETTER BALLOT VOTING SLIP.

Ballots are to be cast by writing "Yes" or "No" opposite the question on this sheet, and mailing it to the Secretary, 390 Old Colony Building, Chicago, Ill.

The ballots will be counted September 5, 1908, and all ballots received after that date will be excluded from the count, as required by the Constitution.

STANDARDS.

JOURNAL BOXES AND AXLES.

1. Distance from center line of bolt hole to inside bearing face of lid, 3¾ by 7 inch journal box. ....

2. Restoration of inside dust guard wall 4¼ by 8 inch journal box. ....

3. Center line of journal box to edge of wedge, 1-16 inch clearance. ....

4. Center line of journal box to edge of wedge, ⅛ inch clearance. ....

5. Increase in depth of 5 by 9 inch journal box. ....

6. Elimination of note regarding total lateral clearance. ....

7. Change of note regarding end of wedge and face of stop. ....

8. Change in radii in tapered portion of axles. ....

9. Change in depth of projection which forms spacer between lugs of brake head. ....

BRAKE BEAMS.

10. Section of bar for brake beam hanger and pins. ....

11. Addition of note on sheet M. C. B. 9 covering diameter of holes for brake levers and connections. ....

12. Brake beam No. 1. ....

13. Brake beam No. 2. ....

14. Brake beam tests. ....

15. Elimination of brake beams hung from car body. ....

FLOORING, ROOFING AND LINING.

16. Increased dimensions of flooring. ....

17. Drawing to show details of flooring 2⅜ inches thick. ....

18. Separate sections for roofing and lining. ....

PIPE UNIONS.

19. Standard pipe thread and taper. ....

AIR BRAKE HOSE.

20. Advancing to standard specifications for woven and combination woven and wrapped air brake hose. ....

COUPLERS AND ATTACHMENTS.

21. Advancing to standard the use of 1¼ inch rivets for attaching yokes to coupler butts. ....

22. Change in dimension of rivet holes in coupler butts. ....

23. Rivet holes in coupler butts to be drilled, or if cored, to be broached out. ....

24. Dimensions back of coupler horn to inside face of knuckle, and minimum thickness of face of front wall of coupler. ....

25. Total lift of locking pin. ....

26. Eyelet for locking device. ....

27. Change in pulling test for couplers. ....

STENCILING CARS.

28. Stenciling height and width on box cars. ....

29. Omission of paragraph relating to stenciling number and initials on floor or cross tie timber of house cars. ....

30. Stenciling of size and kind of attachments on cars. ....

31. Omission from standards of paragraph relating to stenciling the words "air brakes." ....

32. Omission of paragraph from standards relating to filling out defect and repair cards. ....

33. Omission of paragraph from standards relating to "A" and "B" end of cars. ....

34. Omission of paragraph from standards relating to location of lettering. ....

SAFETY APPLIANCES.

35. Safety appliances for freight cars. ....

36. Safety appliances for caboose cars. ....

37. Safety appliances for passenger cars. ....

RECOMMENDED PRACTICE.

BRAKE SHAFT BOW.

A. Brake staff bow for new cars. ....

BRAKE BEAM HANGERS AND PINS.

B. Section of bar for brake beam hanger and pins. ....

C. Uncoupling attachments. ....

RULES FOR LOADING MATERIALS.

D. Change in Rule 11. ....

E. Change in Rule 13. ....

F. New Rule 15-E. ....

G. New Rule 75-A. ....

H. Change in Rule 77. ....

I. Change in Rule 89. ....

J. Change in Rule 90. ....

K. New Rule 98. ....

L. New Rule 98-A. ....

M. Change in Rule 118. ....

N. Change in Rule 119. ....

O. Change in Rule 120. ....

P. Change in Rule 121. ....

Q. New Rule 122. ....

R. New Rule 123. ....

S. Rules for loading long materials in box or stock cars when opportunity is provided for inspection. ....

T. Advancing Rules for loading materials from Recommended Practice to Standard. ....

JOURNAL BOX FOR PASSENGER CARS.

5 by 9 inch Journal.

U. Change of width to 9 inches outside. ....

V. Change of outside dust guard wall opening. ....

W. Change of inside dust guard wall opening. ....

X. Recess at top of dust guard opening. ....

Y. Width of central lugs and location of wedge stop. ....

Z. Change of equalizer fit. ....

AA. Increase of width of front and back flanges of boxes. ....

PASSENGER CAR PEDESTAL.

BB. Pedestal for 5 by 9 inch box. ....

STENCILING CARS.

CC. Elimination of present practice for marking fast freight line cars. ....

DD. New specifications for marking freight cars. ....

TANK CARS.

EE. **Revised tank car specifications.** ....

FF. **Marking tank cars with limit weight.** ....

GG. **Axle requirements for tank cars.** ....

Name..

Title and Road...............................

Address................................

OFFICE OF SECRETARY,
390 OLD COLONY BUILDING,
CHICAGO, ILL., September 14, 1908.

RESULT OF LETTER BALLOT.

To the Members:

The letter ballot which closed September 5, 1908, resulted as follows:

RESULT OF LETTER BALLOT.

No.	SUBJECT.	Yes.	No.	Total.	Necessary to Adoption.	Result.
1	STANDARDS. AXLES AND JOURNAL BOXES. Distance from center line of bolt hole to inside bearing face of lid, 3¾ by 7 inch journal box..........	1,959	80	2,039	1,359	Adopted.
2	Restoration of inside dust guard wall 4¼ by 8 inch journal box	1,946	94	2,040	1,360	"
3	Center line of journal box to edge of wedge, 1-16 inch clearance..................................	956	783	1,739	1,159	Rejected.
4	Center line of journal box to edge of wedge, ⅛-inch clearance..................................	1,338	612	1,950	1,300	Adopted.
5	Increase in depth of 5 by 9 inch journal box.........	1,565	460	2,015	1,350	"
6	Elimination of note regarding total lateral clearance..	1,891	145	2,036	1,357	"
7	Change of note regarding end of wedge and face of stop.	2,040	....	2,040	1,360	"
8	Change of radii in tapered portion of axles	1,037	997	2,034	1,356	Rejected.
9	Change in depth of projection which forms spacer between lugs of brake head.......................	1,947	92	2,039	1,359	Adopted.
10	BRAKE BEAMS. Section of bar for brake beam hanger.............	1,542	496	2,038	1,359	"

11	Addition of note on sheet M. C. B. 9 covering diameter of holes for brake levers and connections.........	1,865	173	2,038	1,359	Adopted.
12	Brake beam No. 1..............................	1,458	575	2,033	1,355	"
13	Brake beam No. 2..............................	1,545	489	2,034	1,356	"
14	Brake beam tests..............................	1,593	240	1,833	1,222	"
15	Elimination of brake beams hung from car body.....	1,709	324	2,033	1,355	"
16	FLOORING, ROOFING AND LINING. Increased dimensions of flooring..................	1,790	222	2,012	1,341	"
17	Drawing to show details of flooring 2¾ inches thick...	1,819	170	1,989	1,326	"
18	Separate sections for roofing and lining............	1,950	74	2,024	1,349	"
19	PIPE UNIONS. Standard Pipe thread and taper..................	1,976	64	2,040	1,360	"
20	AIR BRAKE HOSE. Advancing to standard specifications for woven and combination woven and wrapped air brake hose...	1,763	275	2,038	1,359	"
21	COUPLERS AND ATTACHMENTS. Advancing to standard the use of 1¼-inch rivets for attaching yokes to coupler butts................	1,682	358	2,040	1,360	"
22	Change in dimension of rivet holes in coupler butts...	1,668	372	2,040	1,360	"
23	Rivet holes in coupler butts to be drilled, or if cored, to be broached out...........................	1,985	56	2,041	1,361	"

RESULT OF LETTER BALLOT.—*Continued.*

No.	SUBJECT.	Yes.	No.	Total.	Necessary to Adoption.	Result.
24	Dimensions back of coupler horn to inside face of knuckle, and minimum thickness of face of front wall of coupler	1,702	326	2,028	1,352	Adopted.
25	Total lift of locking pin.	1,705	291	1,996	1,331	"
26	Eyelet for locking device.	1,632	404	2,036	1,357	"
27	Change in pulling test for couplers	1,935	95	2,030	1,353	"
28	STENCILING CARS. Stenciling height and width on box cars	1,559	466	2,025	1,350	"
29	Omission of paragraph relating to stenciling number and initials on floor or cross tie timber of house cars.	1,621	400	2,021	1,347	"
30	Stenciling of size and kind of attachments on cars	1,558	431	1,989	1,326	"
31	Omission from standards of paragraph relating to stenciling the words "air brakes."	1,864	176	2,040	1,360	"
32	Omission of paragraph from standards relating to filling out defect and repair cards	1,707	329	2,036	1,357	"
33	Omission of paragraph from standards relating to "A" and "B" end of cars.	1,594	446	2,040	1,360	"
34	Omission of paragraph from standards relating to location of lettering.	1,703	330	2,033	1,355	"

	SAFETY APPLIANCES.					
35	Safety appliances for freight cars.	1,917	119	2,036	1,357	Adopted.
36	Safety appliances for caboose cars.	1,898	119	2,017	1,345	"
37	Safety appliances for passenger cars.	1,589	99	1,688	1,125	"
	RECOMMENDED PRACTICE. BRAKE SHAFT BOW.					
A	Brake shaft bow for new cars.	1,746	288	2,034	1,356	"
	BRAKE BEAM HANGER.					
B	Section of bar for brake beam hanger.	1,135	897	2,032	1,355	Rejected.
C	Uncoupling attachments.	1,475	554	2,029	1,353	Adopted.
	RULES FOR LOADING MATERIAL.					
D	Change in Rule 11	1,857	99	1,956	1,304	"
E	Change in Rule 13	1,842	114	1,956	1,304	"
F	New Rule 15-E.	1,837	119	1,956	1,304	"
G	New Rule 75-A.	1,842	114	1,956	1,304	"
H	Change in Rule 77	1,897	59	1,956	1,304	"
I	Change in Rule 89	1,902	54	1,956	1,304	"
J	Change in Rule 90	1,897	59	1,956	1,304	"
K	New Rule 98	1,901	55	1,956	1,304	"
L	New Rule 98-A.	1,707	249	1,956	1,304	"

RESULT OF LETTER BALLOT.—*Continued.*

No.	SUBJECT.	Yes.	No.	Total.	Necessary to Adoption.	Result.
M	Change in Rule 118	1,789	164	1,953	1,302	Adopted.
N	Change in Rule 119	1,796	160	1,956	1,304	"
O	Change in Rule 120	1,809	147	1,956	1,304	"
P	Change in Rule 121	1,902	54	1,956	1,304	"
Q	New Rule 122	1,565	392	1,957	1,305	"
R	New Rule 123	1,825	132	1,957	1,305	"
S	Rules for loading long materials in box or stock cars when opportunity is provided for inspection	1,815	142	1,957	1,305	"
T	Advancing rules for loading materials from Recommended Practice to Standard.	1,418	571	1,989	1,326	"
U	JOURNAL BOX FOR PASSENGER CARS 5 by 9 inch Journal. Change of width to 9 inches outside	1,109	481	1,590	1,060	"
V	Change of outside dust guard wall opening	1,124	476	1,600	1,067	"
W	Change of inside dust guard wall opening	1,246	354	1,600	1,067	"
X	Recess at top of dust guard opening.	1,280	310	1,590	1,060	"
Y	Width of central lugs and location of wedge stop.	1,420	169	1,589	1,059	"

Z	Change of equalizer fit.	1,139	447	1,586	1,057	Adopted.
AA	Increase of width of front and back flanges of boxes.	852	486	1,338	892	Rejected.
BB	PASSENGER CAR PEDESTAL. Pedestal for 5 by 9 inch box.	1,088	559	1,647	1,098	"
CC	STENCILING CARS. Elimination of present practice for marking fast freight line cars.	1,955	56	2,011	1,341	Adopted.
DD	New specifications for marking freight cars	1,489	446	1,935	1,290	"
EE	TANK CARS. Revised tank car specifications.	1,761	258	2,019	1,346	"
FF	Marking tank cars with limit weight.	1,756	203	1,959	1,306	"
GG	Axle requirements for tank cars.	1,799	99	1,898	1,265	"

JOS. W. TAYLOR,
Secretary.

STANDARDS AND RECOMMENDED PRACTICE

OF THE

MASTER CAR BUILDERS' ASSOCIATION.

GENERAL.

By a letter ballot cast in 1893, the standards of the Association prevailing at that date were modified—

First.—By abolishing certain standards because they had either become obsolete or nearly so, or because they were simply forms of gauges for shop use to produce certain other standard forms, and it was believed that such gauges were not essential as standards of the Association, and it had been ascertained that they were not generally used.

The old standards thus abolished were:

Wheel diameter testing gauge.
Wheel flange and journal gauge.
Wheel bore testing gauge.
Wheel boring, use of six dogs.
Journal length and diameter gauge.
Journal shoulder and centering gauge.
Journal distance gauge.
Guard-rail gauge. (Made standard again in 1894.)
Attachments and dimensions of drawbars.
Train-pipe fitting for steam heat.

Second.—By ordering that the three items formerly printed at the end of the standards, namely:

Dictionary of terms,
Entertainments,

be printed with the Proceedings as heretofore, but not among the standards.

Third.—By dividing the remaining standards into:

(*a*) Standards of the Association.
(*b*) Recommended Practice.

These Standards and this Recommended Practice are given under their respective heads in the following pages as modified by letter ballot on these or other subjects, and revised by the ballot of 1894 and subsequent years to date.

New drawings of the Standards and Recommended Practice were ordered made on sheets of uniform size, to be lithographed and printed on transparent paper so that blue-prints might be taken from them; such sheets to be held for sale by the Secretary in connection with pamphlets containing explanatory text as given in the Proceedings. Reduced copies of these sheets to be bound with the Proceedings in connection with the text of the Standards and Recommended Practice.

STANDARDS OF THE ASSOCIATION.

JOURNAL BOX AND DETAILS.

For Journals, 3¾ by 7 inches. Sheets M. C. B. 1, 2, 3.

The journal box and details as shown in these drawings were adopted as standards of the Association, by letter ballot, in 1893, and revised in 1894 and 1896. For former action, see Proceedings 1874, page 40; Proceedings 1881, pages 14, 15 and 27.

The revision made in 1894 consisted in correcting the drawing at the top of the journal box, and in leaving off the lugs at sides of arch bars. Also in changing the wedge and bearing so as to make the latter flat on top instead of curved, as theretofore, and in curving the top of the wedge, thus making this construction similar in general arrangement to the standard forms for the 4¼ by 8 inch journal box.

The revision made in 1896 consisted in the elimination of the dust guard from Sheet 1, and the addition of notes providing that any suitable dust guard might be used, and that a rivet or nut might be used instead of the cotter, if preferred, in the hinge pin of the lid. Also in the addition to Sheet 3 of a similar note to the latter, and of notes concerning the lid spring and the wedge. At the same time the side lugs on the brass were increased so as to measure 1⅛ inches long instead of 1 inch long as they were formerly.

One additional note was made on Sheet M. C. B. 1 and two additional notes on Sheet M. C. B. 2 in 1898.

In 1899 the size of bolt hole was increased from 1 inch to 1 1-16 inches.

In 1905 the addition of a rib ⅜ inch deep on the back face of the lid immediately within the inside of the oil box was adopted.

In 1908 a dimension of 3-16 inch was shown, it being the distance from the center line of bolt hole to inside bearing face of lid.

JOURNAL BOX AND DETAILS.

For Journals, 4¼ by 8 inches. Sheets M. C. B. 4, 5, 6.

The journal box and details as shown in these drawings were adopted as standards of the Association, by letter ballot, in 1893, and revised in 1896. For former action see Proceedings 1891, pages 142-144.

The revision made in 1896 consisted in the elimination of the dust guard from Sheet 4; also, in removing the arch bar seat lugs from Sheets 4 and 5, and making the arch bar seat 4½ inches wide. Also, in the addition to Sheet 4 of notes providing that any suitable dust guard might be used, and that a rivet or nut might be used instead of a cotter, if preferred, in the hinge pin of the lid. Also, in the addition to Sheet 6 of a similar note to the latter, and of notes concerning the lid spring and the wedge. At the same time the side lugs on the brass were increased so as to measure 1⅛ inches long instead of ¾ inch long as they were formerly.

One additional note was made on Sheet M. C. B. 4 and two additional notes on Sheet M. C. B. 5 in 1898.

The revision in 1901 consisted of cutting out entirely the inner dust guard wall at the top.

In 1905 the addition of a rib ⅜ inch deep on the back face of the lid immediately within the inside of the oil box was adopted.

In 1908, the inside dust guard was restored at the top and joined to the inside side wall with an opening of 2¾ inches radius, the center being located one inch above the horizontal center line of the box.

In 1908 the distance from center line of box to edge of wedge stop was increased from 4⅝ inches to 4 11-16 inches to allow ⅛ inch clearance between wedge and stop.

JOURNAL BOX AND DETAILS.

For Journals, 5 by 9 inches. Sheets M. C. B. 13, 14 and 15.

The journal box and details shown in these drawings were adopted as recommended practice in 1896. In 1898 they were adopted as standards of the Association.

In 1900 the opening at the back end of box, corresponding with the dust guard, was increased from 3 3-16 inches to 3⅜ inches radius, making the opening 6¾ inches wide instead of 6⅜ inches, the height remaining unchanged.

The revision in 1901 consisted of cutting out entirely the inner dust guard wall at the top.

In 1902 the wedge stop lugs were increased in size and extended laterally to the sides of box.

In 1905 the addition of a rib ⅜ inch deep on the back face of the lid immediately within the inside of the oil box was adopted.

In 1907 the inside dust guard was restored at the top and joined to the inside side wall with a 3-inch radius, with the center located 1 inch above the horizontal center line of the box. The opening in the outside wall was enlarged at the side and struck with a 4-inch radius all around. The distance from the center of the box to the inside of the lug for the journal bearing key located in the top wall of the box was increased to 5 3-16 inches. The width of the inside side lugs for the journal bearings was decreased to 2⅝ inches.

In 1908 the center of box from which the lower half of the circle is struck was raised ¼ inch, increasing the depth to 1⅝ inches.

JOURNAL BOX AND DETAILS.

For Journals, 5½ by 10 inches. Sheets M. C. B. 16, 17 and 18.

The journal box and details shown in these drawings were adopted as standard in 1900.

In 1901 the inner dust guard wall at the top was cut out entirely to avoid all danger of the journal bearing striking the wall of the box at the rear.

In 1902 the wedge stop lugs were extended laterally to the sides of box.

In 1903 the radius of the dust guard opening was changed to 3⅝ inches, and the diameter to 7¼ inches to allow proper play for the wheel fit.

In 1905 the addition of a rib ⅜ inch deep on the back face of the lid immediately within the inside of the oil box was adopted.

In 1907 the inside dust guard was restored at the top and joined to the inside side wall with a 3-inch radius located 1½ inches above the horizontal center line of the box. The opening in the outside back wall was enlarged at the side and struck with two 4-inch radii, the lower one-half having its center line on the center line of box, the center of the upper one-half being ⅛ inch above the center line of the box. The distance from center of the box to the inside of the lug for the journal box key was increased to 5 11-16 inches. The width of the inside side lugs for journal bearings was decreased to 2⅝ inches.

In 1908 the distance from center line of box to face of wedge stop was increased from 5 11-16 inches to 5¾ inches, thus allowing ⅛ inch clearance between wedge and stop.

In 1908 the note reading "the total lateral [extreme positions of axle] equals ⅜ inch," was eliminated.

PASSENGER CAR JOURNAL BOX AND CONTAINED PARTS.

For Journals, 4¼ by 8 inches. Sheet M. C. B. 21.

In 1898 a Recommended Practice was adopted for passenger car journal box and contained parts for journals 4¼ by 8 inches, and was formerly shown on Sheet M. C. B.—G. In 1901, as a result of letter ballot, this was changed to Standard, and is now shown on Sheet M. C. B. 21.

JOURNAL BEARING AND WEDGE GAUGES.

Journals, 3¾ by 7, 4¼ by 8, 5 by 9 and 5½ by 10 inches. Sheet 23.

In 1900 gauges for journal bearings and wedges for journals 5 by 9 inches and 5½ by 10 inches were adopted as standard.

In 1903 gauges for journal bearings and wedges for journals 3¾ by 7 inches and 4¼ by 8 inches were advanced from recommended practice to standard. They are shown on Sheet M. C. B. 23.

AXLES.

In 1899 it was decided that the standard axles should be known by letters.

In 1901 a designation was given the standard axles, whereby each shall be known to carry a definite weight instead of for cars of particular capacity. See Sheet M. C. B. 7.

AXLE.—A.

With Journals, 3¾ by 7 inches. Sheet M. C. B. 7.

Designed to carry 15,000 pounds.

This axle is the standard of the Association for cars of 40,000 pounds capacity.

In 1873 a standard for car axle was recommended, the form and dimensions of which, excepting the diameter in the middle, were substantially the same as shown in this sheet. In 1884 the diameter at the middle was increased from 3⅞ inches to 4¼ inches, by letter ballot.

In 1901 the diameter of wheel seat was changed from 4⅞ to 5⅛ inches.

In 1901 a notation was added to the drawing of this axle showing a straight taper between certain points on the axle (see Sheet M. C. B. 7); also a diagram showing location of the borings to be taken from steel axles for analysis. See Sheet M. C. B.— A.

In 1902 further changes were made in the diameter of the tapered portion where it joins the fillet next to the rough collar; also in the diameter of the rough collar.

For action of the Association see Proceedings 1876, page 99; Proceedings 1878, page 129; Proceedings 1879, page 103; Proceedings 1880, page 130; Proceedings 1884, pages 156-162.

In 1907 the radius between the wheel seat and the rough collar on the inside of the hub of the wheel was changed to ¾ inch, with the center from which the radius is struck coincident with the inside face of the hub of the wheel.

The radius between the dust guard and wheel seat was changed to ¼ inch.

AXLE.—B.

With Journals, 4¼ by 8 inches. Sheet M. C. B. 7.

Designed to carry 22,000 pounds.

This axle was adopted as a standard of the Association for cars of 60,000 pounds capacity, by letter ballot, in 1889; see Proceedings 1889, pages 88-109.

In 1901 the diameter of wheel seat was changed from 5⅜ inches to 5¾ inches.

In 1901 a notation was added to the drawing of this axle, showing a straight taper between certain points on the axle (see Sheet M. C. B. 7); also a diagram showing location of borings to be taken from steel axles for analysis. See Sheet M. C. B.— A.

In 1901 the diameter of the middle was increased from 4⅝ inches to 4¾ inches.

In 1902 changes were made in the diameter of the tapered portion of the axle where it joins the fillet next to collar.

In 1907 the radius between the wheel seat and the rough collar on the inside of the hub of the wheel was changed to ¾ inch, with the center from which the radius is struck coincident with the inside face of the hub of the wheel.

The radius between the dust guard and wheel seat was changed to ¼ inch.

AXLE.—C.

With Journals, 5 by 9 inches. Sheet M. C. B. 7.

Designed to carry 31,000 pounds.

This axle was adopted as recommended practice in 1896, and was made a standard of the Association in 1898.

In 1901 the diameter of wheel seat was changed from 6⅜ inches to 6½ inches.

In 1901 a notation was added to the drawing of this axle showing a straight taper between certain points on the axle (see Sheet M. C. B. 7); also a diagram showing the location of borings to be taken from steel axles for analysis. See Sheet M. C. B.— A.

In 1902 changes were made in the diameter of the tapered portion of the axle where it joins the fillet next to collar, also in the diameter of the rough collar.

In 1907 the radius between the wheel seat and the rough collar on the inside of the hub of the wheel was changed to ¾ inch, with the center from which the radius is struck coincident with the inside face of the hub of the wheel.

The radius between the dust guard and wheel seat was changed to ¼ inch.

AXLE.—D.

With Journals, 5½ by 10 inches. See M. C. B. 7.

Designed to carry 38,000 pounds.

This axle was adopted as a standard of the Association in 1899.

In 1901 the diameter of wheel seat was changed from 6⅞ inches to 7 inches.

In 1901 a notation was added to the drawing of this axle showing a straight taper between certain points on the axle (see Sheet M. C. B. 7);

also a diagram showing the location of borings to be taken from steel axles for analysis. See Sheet M. C. B.— A.

In 1902 changes were made in the diameter of the tapered portion of the axle where it joins the fillet next to collar; also in the diameter of the rough collar.

In 1906 a ¾-inch radius was adopted between the wheel fit and the rough collar adjoining the inside hub of the wheel; also the radius between the dust guard and wheel fit was increased to ¼ inch.

In 1907 the center from which the radius of ¾ inch is struck was made coincident with the inside face of the hub of the wheel.

WHEEL CIRCUMFERENCE MEASURE.

Sheet M. C. B. 7.

By letter ballot in 1893 a Wheel Circumference Measure was adopted as a standard of the Association. Prior to that date it had been recommended for use in all car building shops. See Proceedings 1892, page 172.

In 1900 a new form of Wheel Circumference Measure was adopted as standard, as shown on Sheet 7. See Proceedings 1900, page 114.

BRAKE HEAD AND SHOE.

Sheet M. C. B. 8.

The brake head and shoe shown on this sheet, known as the Christie brake head and shoe, were adopted as a standard of the Association, by letter ballot, in 1886, with the exception of some slight modification in details made since that date. Drawing revised in 1896, 1898 and 1907.

The revision made in 1896 consisted in the modification of the designs of brake head and shoe so as to secure increased clearance at the ends of shoe and equal clearance both above and below the central lug on the back of the shoe; also, the addition of brackets to support the lower bridge lug of brake head similar to the brackets formerly used to support the upper bridge lug. The taper of the shoe was altered so that it would correspond with the taper of the standard wheel tread, by increasing the thickness of the inner edge of the shoe from 1 3-16 inches to 1 5-16 inches.

The revision made in 1898 consisted in reducing the clearance allowed on either side (above and below) the central lug of brake shoe and adjacent lugs of brake head from ⅛ inch to 1-16 inch—the change being made wholly in the head and no change in the shoe.

In 1907 the drawing was further revised to show only the standard dimensions of the brake head, and also in the combined drawing of the brake head and shoe.

The drawing showing the shoe was also revised in part, as well as the drawing showing the relation of ends of head and shoe. See Sheet M. C. B. 8.

In 1908, the projection, top and bottom, at back of brake shoe, which forms spacer between lugs of brake head, was increased to 9-16 inch in depth.

BRAKE BEAMS.

Sheet M. C. B. 22.

Certain dimensions and capacities of brake beam were adopted as standard of the Association, by letter ballot, in 1889, and these standards, as modified by subsequent action, are shown on this drawing for iron brake beams.

All beams must be capable of withstanding a load of 7,500 pounds at center without more than 1-16 inch deflection; where it is necessary to use a stronger beam, it must be capable of standing a load of 15,000 pounds at center without more than 1-16 inch deflection.

Standard heights of brake beams, when measured from the tops of the rails to the center of the face of new shoes, were adopted in 1894, as follows:

For inside hung beams, 13 inches.

For outside hung beams, 14½ inches.

In 1907 the following details for brake beams and gauges were adopted as standard:

All brake beams shall be 60¼ inches in length from center to center of brake head, with an allowable variation of ⅛ inch in either direction.

All brake beams shall be proven by gauge shown on Sheet M. C. B. 22, which shall be the standard gauge for this purpose.

Attachments for safety hangers shall be 51 inches from center to center.

The angle of the lever fulcrum shall be 40 degrees from the vertical.

The lever pin hole shall be either 2 inches or 3 inches in front of the top of the brake head lugs. The variations in either directions from above measurements shall not exceed 1-16 inch. Holes should be made straight and true by drilling, reaming or broaching, and shall be not less than 1 3-32 inches nor more than 1⅛ inches in diameter.

All lever pin holes shall be proven by gauge shown on Sheet M. C. B. 22, which shall be the standard gauge for that purpose.

In 1908 the following detail regarding brake beams was advanced from Recommended Practice to Standard:

Brake beam hangers shall be ⅞ inch in diameter.

In 1908 two brake beams were adopted as standard, as follows:

Brake beam No. 1 to be suitable for cars weighing not over 35,000 pounds light weight.

Brake beam No. 2 to be suitable for cars exceeding 35,000 pounds light weight.

BRAKE BEAM SPECIFICATIONS AND TESTS.

For each 500 brake beams or less, which pass inspection and are ready for shipment, one representative beam shall be taken at random and subjected by the company manufacturing the beams, and in the presence of the railroad company's inspector, to the following test in a suitable machine:

The beams shall be equipped with suitable heads and shoes, and the shoes placed in contact with castings representing the tread of the wheel; when mounted in this manner the load shall be applied to the fulcrum in the normal line of pull. As a preliminary to the test a load of 6,000 pounds shall be applied and released, after which observations for records shall be taken. Beam No. 1, under a load of 6,500 pounds shall not deflect to exceed .0625 inch; beam No. 2, under a load of 12,000 pounds, shall not deflect to exceed .0625 inch.

In case a beam shall fail in this test, then a second beam shall be taken from the same lot and similarly tested. If the second beam stands the test it shall be optional with the inspector whether he shall test a third beam or not. If he does not do so, or if he does, and the third beam stands the test, the 500 beams or less shall be accepted as filling the requirements of this test.

Individual beams will not be accepted which (1) do not conform to standard dimensions, and (2) those that have physical defects. Any lot of 500 beams, or less, submitted for test that fail to meet the prescribed test will not be accepted.

On cars built after September 1, 1909, it will not be permissible to hang brake beams from any portion of the body of the car.

BRAKE BEAM GAUGE.

Sheet M. C. B. 22.

In 1907 a brake beam gauge as shown on Sheet M. C. B. 22 was adopted as standard.

BRAKE HEAD GAUGE.

Sheet M. C. B. 22.

In 1907 a brake head gauge was adopted as standard. See Sheet M. C. B. 22.

For action of the Association, see Proceedings 1886, page 72; Proceedings 1888, pages 140, 160, 161; Proceedings 1891, pages 212 and 240.

LEVER PIN HOLE GAUGE.

Sheet M. C. B. 22.

In 1907 the lever pin hole gauge shown on Sheet M. C. B. 22 was adopted as standard.

SPECIFICATIONS FOR BRAKE SHOES.

In 1901 the following specifications were adopted as standard as a result of letter ballot:

For Cast-Iron Chilled Wheels.

Shoes when tested on the Master Car Builders' Association testing machine, in effecting stops from an initial speed of forty miles per hour, shall develop upon a cast-iron chilled wheel a mean coefficient of friction of not less than

22 per cent when the brake shoe pressure is 2,808 pounds.
20 per cent when the brake shoe pressure is 4,152 pounds.
16 per cent when the brake shoe pressure is 6,840 pounds.

For Steel-Tired Wheels.

Shoes, when tested on the Master Car Builders' Association testing machine, in effecting stops from an initial speed of sixty-five miles per hour, shall develop upon a steel-tired wheel a mean coefficient of friction of not less than

16 per cent when the brake shoe pressure is 2,808 pounds.
14 per cent when the brake shoe pressure is 4,152 pounds.
12 per cent when the brake shoe pressure is 6,840 pounds.

AIR BRAKES — GENERAL ARRANGEMENT AND DETAILS.

Sheet M. C. B. 9.

The general arrangement and details of brake gear for air-brake cars, as shown on this sheet, are standard. See letter ballot 1889, and other action 1890, 1891 and 1898. At the same time the following standards were adopted in this connection:

1. Maximum train-pipe pressure, 70 pounds per square inch.
2. Maximum brake power in freight cars, 70 per cent of the light weight of car.
3. All levers 1 inch in thickness; all pins to be 1 3-32 inches in diameter; all jaws or clevises made of ¾-inch by 2½-inch iron; all rods ¾ inch diameter.
4. Angle of brake beam lever, 40 degrees with vertical.

Drawing revised in 1896 and 1898.

The revision made in 1896 consisted in the omission of such detail dimensions as could not be used in all cases, such as the length and proportions of main levers, and the omission of some of the smaller parts from the drawing, such as the pipe clamps, staples, etc. The dimensions of the cross-section of the malleable iron truck lever connection were increased, and the letters W. I., M. I., C. I., etc., indicating the material of which the parts were to be made, were omitted from the drawing.

In 1898 the following changes were made in Sheet M. C. B. 9:

Diameter of truck lever connection for outside hung brakes changed from ¾ inch to ⅞ inch, and a note to this effect was added under title on this sheet.

Diameter of hole for cotter in air-brake pin was first indicated as 7-16 inch.

Addition was made to note under drawing of truck lever connection for inside hung brakes as follows: "If made of round iron or steel, must not be less than 1⅝ inches diameter."

Dummy coupling was omitted from drawing and air hose was shown as hanging down.

The words "33 inches or" were omitted from height shown for air-brake pipe above rail.

Diameter of release-valve rod was changed from ¼ inch to ⅜ inch.

In 1900 a standard brake pipe nipple, 10 inches long, was ordered shown located directly back of the angle cock.

See Sheet M. C. B.—G. for recommended practice for location of air-brake parts.

In 1904 the location of the main air pipe and angle cock was changed from Recommended Practice to Standard. See letter ballot, Proceedings 1904.

In 1907 the following specifications were adopted:

That ⅜ inch straight link chain be made standard for hand brake chain, except on cars on which there is rapid deterioration, on which 7-16 inch chain shall be used. Hand brake chain to be attached to brake mast by a ½ inch machine bolt instead of an eye bolt.

In 1908 the diameter of the holes in the different levers, guides, brackets and connections were omitted, and a note added to Sheet M. C. B. 9 reading as follows: "All holes for brake pins not less than 1 3-32 inches diameter nor more than 1⅛ inches diameter."

HEIGHT OF BRAKE STAFF.

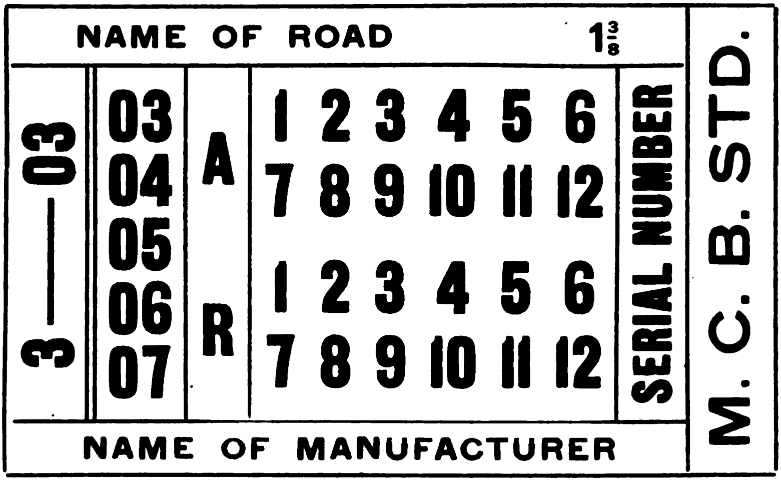
In 1907 a standard maximum height of brake staff, for standard box cars, from top of rail to top of brake staff of 14 feet was adopted.

LABEL FOR AIR-BRAKE HOSE.

Sheet M. C. B. 9.

In 1902 the label for hose, as shown in the specifications for air-brake hose, was made a standard. Revised in 1903. The specification for its use is as follows:

Each standard length of hose must be branded with the name of the manufacturer, year and month when made, and serial number, the initials of the railway company, and also have a table of raised letters at least 3-16 inch high to show the date of application and removal, thus:



The above gives outline of modification of label. Extension being on right-hand end.

All markings to be full and distinct and made on a thin layer of white or red rubber, vulcanized, and so applied as to be removed either by cutting with a knife or sharp instrument.

SPECIFICATIONS FOR AIR-BRAKE HOSE.

In 1901 specifications and tests for air-brake hose were adopted as Recommended Practice. Advanced to Standard in 1903. Revised 1905.

1. All air-brake hose must be soft and pliable, and not less than two-ply nor more than four-ply. They must be made of rubber and cotton fabric, each of the best of its kind made for the purpose. No rubber substitutes or short-fiber cotton to be used.

2. The tube must be hand-made, composed of three calendars of rubber. It must be free from holes and imperfections, and in joining must be so firmly united to the cotton fabric that it can not be separated without breaking or splitting the tube. The tube must be of such composition and so cured as to successfully meet the requirements of the stretching test given below; the tube to be not less than 3-32 inch thick at any point.

3. The canvas or woven fabric used as wrapping for the hose to be made of long-fiber cotton, loosely woven, and to be from 38 to 40 inches wide, and to weigh not less than 20 and 22 ounces per yard, respectively. The wrapping must be frictioned on both sides, and must have, in addition, a distinct coating or layer of gum between each ply of wrapping. The canvas wrapping must be applied on the bias. Woven or

braided covering should be so loose in texture that the rubber on either side will be firmly united.

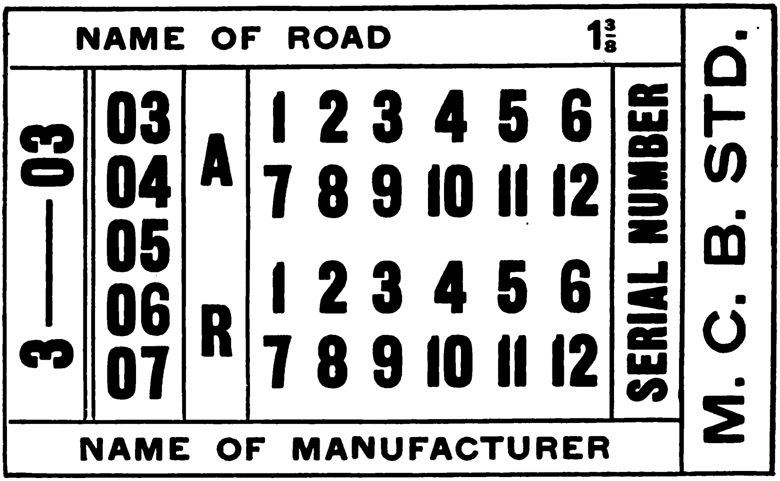
4. The cover must be of the same quality of gum as the tube, and must not be less than 1-16 inch thick.

5. Hose is to be furnished in 22-inch lengths. Variations exceeding ¼ inch in length will not be permitted. Rubber caps not less than 1-16 inch nor more than ⅛ inch must be vulcanized on each end.

6. The inside diameter of hose must not be less than 1⅜ inches nor more than 17-16 inches, nor must the outside diameter exceed 2⅛ inches. Hose must be smooth and regular in size throughout its entire length, except at a point 2½ inches from either end, where the inside calendar of rubber may be increased 1-16 inch for the distance of ¼ inch toward either end and then tapering to the regular diameter.

7. Each length of hose must have vulcanized to it a badge of white or red rubber as shown. On the top of the badge the name of the purchaser; on the bottom the maker's name; on the left-hand end the month and year of manufacture, and on the right-hand end the serial number and the letters 'M. C. B. Std.' These letters and figures must be clear and distinct, not less than 3-16 inch in height, and stand in relief not less than 1-32 inch, so that they can be removed by cutting without endangering the cover. Each lot of 200 or less must bear the manufacturer's serial number, commencing at one (1) on the first of the year, and continuing consecutively until the end of the year.

For each lot of 200, one extra hose must be furnished free of cost.



The above gives outline of modification of label. Extension being on right-hand end.

8. Test hose will be subject to the following tests:

BURSTING TEST.

The hose selected for test will have a section five (5) inches long cut from one end and the remaining seventeen (17) inches will then be subjected to a hydraulic pressure of 100 pounds per square inch, under which pressure it must not expand more than ¼ inch nor develop any small leaks or defects. The section will then be subjected to a hydraulic pressure of 400 pounds per square inch for ten minutes, without bursting.

FRICTION TEST.

A section one (1) inch long will be taken from the five (5) inch piece previously cut off, and the quality determined by suspending a 20-pound weight to the separated end, the force being applied radially, and the time of unwinding must not exceed eight (8) inches in ten minutes.

STRETCHING TEST.

Another section one (1) inch long will be cut from the balance of the five (5) inch piece, and the rubber tube or lining will be separated from the ply and cut at the lap. Marks two inches apart will be placed on this section, and then the section will be quickly stretched until the marks are eight (8) inches apart and immediately released. The section will then be remarked as at first and stretched to eight (8) inches and will remain so stretched ten (10) minutes. It will then be released, and ten (10) minutes later the distance between the marks last applied will be measured. In no case must the test piece break or show a permanent elongation of more than ¼ inch between the marks last applied. Small strips taken from the cover or friction will be subjected to the same tests.

9. If the test hose fails to meet the required tests, the lot from which it was taken may be rejected without further examination and returned to the manufacturer, who shall pay the freight charges in both directions. If the test hose is satisfactory the entire lot will be examined, and those complying with the specifications will be accepted.

SPECIFICATIONS AND TESTS FOR WOVEN AND COMBINATION WOVEN AND WRAPPED AIR-BRAKE HOSE.

In 1907 the following specifications were adopted for Woven and Combination Woven and Wrapped Air-Brake Hose, as Recommended Practice. In 1908 they were advanced to Standard.

All air-brake hose under this specification is to consist of not less than three plies of woven, braided or knitted fabric, or of two or more plies of canvas wrapping surrounded by at least one ply of woven, knitted or braided fabric. The hose should be flexible without kinking easily. The rubber, fabric or duck should be the best of its kind made for the purpose, and no rubber substitute or short fiber fabric will be allowed.

The inner tubes should be composed of three calendars of rubber and not less than 3-32 inch thick at any point. Should a machine-made tube be used, it must not be less than ⅛ inch thick at any point. It must be free from holes and imperfections, and in joining it must be so firmly united to the cotton fabric that it can not be separated without breaking or splitting the tube. Each ply of the hose should be separated by a distinct layer of rubber, and over this is to be a cover 1-16 inch thick, and at each end a 1-16 inch cap should be vulcanized on, the cover and the cap to be of the same material as the inner tube.

The hose is to be furnished in 22-inch lengths, and variations exceeding ¼ inch from this length will not be permitted. The rubber caps at each end are not to be less than 1-16 inch nor more than ⅛ inch thick. The inside diameter of the hose must not be less than 1⅜ inches nor more than 1 7-16 inches, nor must the outside diameter be less than 2 1-32 inches nor greater than 2 3-32 inches. The hose must be smooth and regular in size throughout its entire length.

Each hose must have vulcanized to it a badge of white or red rubber as shown; on the top of the badge the name of the purchaser, on the bottom the maker's name, on the left-hand end the month and year of manufacture, and on the right-hand end the serial number and letters "M. C. B. Standard." The letters and figures must be clear and distinct, not less than 3-16 inch in height, and stand in relief not less than 1-32 inch, so they can be removed by cutting without endangering the cover.

Each lot of 200 or less must bear the manufacturer's serial number, commencing at "1" on the first of the year and continuing consecutively until the end of the year, and the serial number should not be duplicated, even though the hose bearing the original numbers be rejected. For each lot of 200, one extra hose must be furnished free of cost.

TESTS TO WHICH SAMPLES WILL BE SUBJECTED.

Bursting Test.— All hose selected for test will have a section 5 inches long cut from one end and the remaining 17 inches will then be subjected to a hydraulic bursting pressure of 400 pounds per square inch for ten minutes, which it must stand without failure. At a pressure of 100 pounds per square inch it must not expand more than ¼ inch in diameter or change in length more than ¼ inch, nor develop any small leaks or defects.

Friction Test.— A section 1 inch long will be taken from the 5-inch piece previously cut off, and the quality determined by suspending a 20-pound weight to the separated end, the force being applied radially, and the time of unwinding must not exceed 8 inches in ten minutes.

Stretching Test.— Another section 1 inch long will be cut from the balance of the 5-inch piece and the inner tube or lining will be separated from the ply and cut at the lap. Marks two inches apart will be placed on this section, and then the section will be quickly stretched until the marks are 8 inches apart and immediately released. The section will then be remarked as at first and stretched to 8 inches and will remain so stretched ten minutes. It will then be released and ten minutes later the distance between the marks last applied will be measured. In no case must the test piece break or show a permanent elongation of more than ¼ inch between the marks last applied. One-inch strips will also be taken from the cover and will be subjected to the same test.

TENSILE TEST.—Another section 1 inch long will be cut from the remainder of the 5-inch piece and the rubber tube or lining will be separated from the ply and cut at the lap. It will then be reduced in the middle for a distance of 2 inches by ½ inch wide parallel. The parallel section shall be spread to the full width of 1 inch at the end by curves of ½ inch radius. This specimen shall be stretched uniformly by gripping the enlarged ends, and in no case should the tensile strength per square inch be less than 400 pounds, nor the elongation at the time of failure less than 8 inches, measured by marks placed originally 2 inches apart before breaking.

If the test hose fails to meet the required tests the lot from which it was taken may be rejected without further examination and returned to the manufacturer, who shall pay the freight charges in both directions. If the test hose is satisfactory the entire lot will be examined and those complying with the specifications will be accepted.

AIR-BRAKE REPAIR CARD.

In 1894 a Recommended Practice was adopted to use an air-brake repair card to report to division terminals such defects as are found by trainmen which require brake to be cut out. This was revised in 1898, and is now as shown on following page to be attached as near to the car number as possible.

In 1902 this was made a Standard of the Association.

In 1903 letters were substituted for figures to indicate the various defects.

THE .... RAILWAY CO.

AIR-BRAKE CUT-OUT CARD.

Applied to Car No. .... *Initials* ....

Date .... *at* ....

By .... *Inspector.*

By .... *Cond'r.* *Train No.* ....

Defects ....

USE LETTERS TO DESIGNATE DEFECTS.

The .... Railway Co.

AIR-BRAKE CUT-OUT.

CAR CAN BE PLACED BETWEEN AIR-BRAKE CARS.

Car No. .... *Initials* .... *Date* ....

Card Applied at .... *Train No.* ....

DEFECTS.

A TRIPLE VALVE.
B RESERVOIR.
C CYLINDER.
D CYLINDER PACKING.
F RELEASE COCK.
H CROSS-OVER PIPE.
L BRAKE RIGGING.
M ODD BRAKE.
N ....

By .... *Inspector.* | *By* .... *Conductor.*

.... DIVISION.

THE .... RAILWAY CO.

DEFECTIVE AIR-BRAKE CARD.

Applied to Car No. .... *Initials* ....

Date .... *at* ....

By .... *Inspector*

By .... *Cond'r.* *Train No.* ....

Defects ....

USE LETTERS TO DESIGNATE DEFECTS.

The .... Railway Co.

DEFECTIVE AIR BRAKE.

CAR CANNOT BE PLACED BETWEEN AIR-BRAKE CARS.

Car No. .... *Initials* .... *Date* ....

Card Applied at .... *Train No.* ....

DEFECTS.

A TRIPLE VALVE.
B RESERVOIR.
C CYLINDER.
D CYLINDER PACKING.
E CUT-OUT COCK.
F RELEASE COCK.
G ANGLE COCK.
H CROSS-OVER PIPE.
J TRAIN PIPE.
K HOSE CONNECTION.
L BRAKE RIGGING.
M ODD BRAKE.
N ....

By .... *Inspector.* | *By* .... *Conductor.*

.... DIVISION

AUTOMATIC COUPLER.

Sheet M. C. B. 11.

Form adopted as standard in 1887, see pages 199-208, 243 and 253. Further details adopted in 1889 and 1893. Action of the Association in 1889 permits the use of a coupler 28 inches long instead of 30 inches as shown, for use only on cars already in service and requiring such length coupler. In 1889 the Association decided that the opening in carrier iron, where coupler enters, should be 5¾ inches vertically and 5½ inches horizontally.

Drawing revised in 1896.

In 1903 the solid knuckle was adopted as a standard of the Association to be used for all repairs and in all new couplers after January 1, 1904.

In 1903 a recommendation was made that for new equipment purchased after January 1, 1904, only such couplers as have a lock set on or within the head and which do not depend upon the uncoupling lever to hold up the lock should be specified. By letter ballot this was adopted as a standard.

The revision made in 1896 consisted in the elimination of the carrier iron from Sheet B of the Recommended Practice.

In 1899 the play of the shank of the coupler in the carry arm was changed to not less than ½ inch on each side. See letter ballot, 1899.

In 1899 the vertical dimension of the knuckle was fixed at 9 inches as a minimum.

In 1899 the vertical dimension of the end of guard arm was fixed at 7½ inches as a minimum.

In 1899 the recommendation of the Coupler Committee that the horizontal plane containing the axis of the shank of the coupler bisect the vertical dimensions of the knuckle and end of guard arm, was adopted as a standard of the Association.

In 1899 the vertical height of the stop shoulder, or horn of coupler, was fixed at not less than 3½ inches.

In 1899 the recommendation of the Coupler Committee that the horn of the coupler be arranged to touch the striking plate before the back of the head of the coupler strikes the ends of the draft timbers, was adopted as a standard of the Association.

In 1899 the sizes of pivot pins were fixed as follows:

1½ inches or 1⅝ inches in diameter and 13½ inches from the under side of head to center of pin hole for ⅜-inch cotter.

In 1901 a design of shank 5 by 7 inches back of the head was submitted, and, upon reference to letter ballot, was adopted as standard.

In 1904, as a result of the letter ballot, the note in the lower left-hand corner of Sheet M. C. B. 11, relating to pivot pins, was changed to read as follows:

"Pivot pin must be of steel, 1⅝ inches in diameter, of sufficient length to permit applying a ⅜-inch cotter pin below the coupling lug."

In 1905 an additional dimension "not less than 20¾ inches" was added to plan view of 5 by 7 inch coupler on Sheet M. C. B. 11 to definitely locate the point at which shank shall measure 7 inches. Also the note, "Tail End for Continuous Draft," under the drawing of slotted tail coupler, was omitted as being unsuited for present approved practice.

In 1907 a butt 5x5½x9⅛ inches for friction draft gear (see Sheet M. C. B. 11) was adopted as standard.

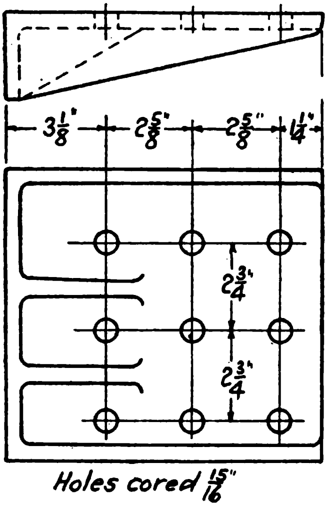
In 1907 the following details were advanced from Recommended Practice to Standard:

SPACING BETWEEN CENTER SILLS.

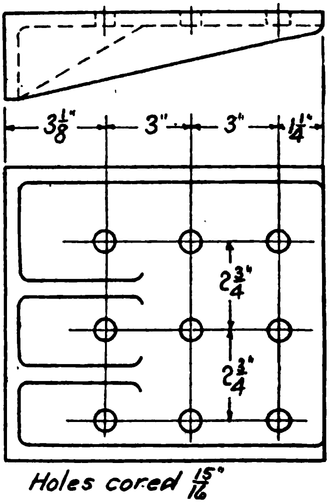
That the spacing between steel center sills be 12⅞ inches.

FRONT AND BACK STOPS.

That front and back stops with rivet holes 15-16 inch in diameter be spaced as shown below:



Drawing A.



Drawing B.

SPACING BETWEEN COUPLER HORN AND BUFFER BEAM.

That the spacing between coupler horn and buffer beam be 1¾ inches for all spring gear, and 2¾ inches for all friction gear.

FOLLOWERS.

That flat followers be made of wrought iron or open hearth steel 1⅝ inches thick for tandem spring gear and 2¼ inches thick for twin spring and friction gear.

SIDE CLEARANCE OF COUPLERS.

That the total side clearance of the coupler be not less than 2½ inches.

In 1907 the back wall of butt was changed to ¾ inch thick, owing to the fact that the tail pin had fallen into disuse and there was no necessity for so much metal there.

The width of shank was changed to 5 inches on both sizes of coupler shanks to properly provide for securing yokes.

A dimension of not less than 1¼ inches was shown forward of the 9⅛ inch butt to provide for the increased length of gib. A limiting dimension of not more than 1 inch was shown for the diameter of core hole in lug of knuckle to prevent a recurrence of the slotted knuckle weakness. A note was added to the effect that there should be no projections on the bottom of the shank from the line of the horn back for 12 inches to provide for proper movement of shank on carrier iron.

In 1908 the use of 1¼ inch rivets for attaching yokes to coupler butts was advanced from Recommended Practice to Standard.

In 1908 the diameter of rivet holes in coupler butts was changed from 1 3-16 inches to 1 5-16 inches.

In 1908 the following notes were added to Sheet M. C. B. 11:

That all new types of couplers put on the market after January 1, 1909, have a dimension of 9¼ inches from back of coupler horn to inside face of knuckle, and that the face or front wall of coupler have a minimum thickness of 1¼ inches.

That the total lift of locking pin be not more than 6 inches.

That all couplers must have an eyelet for locking device located immediately above locking pin hole.

CONTOUR LINE AND LIMIT GAUGES, FOR AUTOMATIC COUPLER.

Sheet M. C. B. 11.

Standard contour line was announced by Executive Committee under instructions from the Association April 8, 1888. Limit gauges for preserving standard contour line adopted in 1891.

These gauges, properly proven by master gauges, may be procured from Pratt & Whitney Company, of Hartford, Connecticut. A duplicate set of master gauges is held in the office of the Secretary for reference when desired.

In 1899 the contour lines showing the length of the guard arm was extended about one inch. See Sheet M. C. B. 11.

In 1899 the M. C. B. standard limit gauge for new couplers was changed by moving the screw to a new position. See M. C. B. Sheet 11.

In 1902 the contour gauge was strengthened by the use of a solid web in the weak part of the frame, and part of the outside flange increased to ¼ inch in thickness. The handhold was also reduced in size to give greater strength.

In 1903 the contour line of the M. C. B. coupler was changed as now shown on Sheet M. C. B. 11.

In 1904 the coupler and knuckle limit gauges were changed to conform to the contour lines adopted in 1903 and to have raised figures "1904" cast on them. See letter ballot, Proceedings 1904.

GAUGE FOR WORN COUPLERS.

Sheet M. C. B. 12.

In 1899 the Coupler Committee recommended a form of gauge to define the contour lines more fully when worn. This gauge was adopted as Recommended Practice.

In 1904 the committee on M. C. B. couplers recommended a modification of the wheel defect gauge, which would make a more satisfactory worn limit coupler gauge, which was adopted by letter ballot. See Proceedings, 1904; also Sheet A. Modified and adopted as Standard in 1905. Modified 1907. See Sheet 12.

SPECIFICATIONS FOR M. C. B. AUTOMATIC COUPLERS.

In 1899 specifications and tests for M. C. B. automatic couplers were adopted as Recommended Practice. In 1903 they were revised.

In 1905 they were revised and adopted as Standard.

For drop testing machine and details, see Sheet M. C. B.—I.

The couplers furnished under this specification must be made of steel in accordance with the best foundry methods and must not be painted.

1. Couplers will be subject to the inspection and test of the above named company as to their mechanical workings, general condition and strength. The tests and inspection will be made at the place of manufacture, where assistance and labor necessary to make satisfactory and prompt inspection and shipment must be furnished free by the manufacturer. The testing machine and gauges approved by the M. C. B. Association must be used in the test and inspection of couplers.

2. Couplers will be ordered as far as practicable in lots of one thousand; for each one thousand ordered the manufacturer shall furnish 1,014 and in the event of additional couplers being required to carry out the prescribed tests, they shall be furnished free of cost by the manufacturers.

3. Bars, knuckles and locking pins or blocks must be accurately made to gauges furnished by the manufacturer. These gauges must govern all dimensions representing fitting surfaces, thereby insuring absolute interchangeability and freedom of motion between the assembled parts without further adjustment or machining. When assembled, knuckles and locking pins or blocks must work freely, but the lost motion between knuckles and bars must not permit more than ⅛ inch vertical play, or between knuckles and locks must not permit the knuckle to drop forward beyond the proper contour line, but ¼ or ⅜ of an inch lost motion in opposite direction is desirable.

4. Couplers must conform to M. C. B. standard drawings and contour lines and must have a lock set within the head of the coupler; they must be so designed as not to part when the knuckle pin is removed or broken. They must couple and uncouple with each other (with either or both knuckles open) and also with the master or sample coupler; they should lock easily when the knuckle is pushed in by hand. They must have steel pivot pins 1⅝ inches in diameter of sufficient length to permit applying a ⅜-inch cotter pin through the pin below the coupler lug. Pivot pins, after having the heads struck up, must be properly annealed.

The lock lift must be in the central longitudinal vertical plane of the coupler, located between striking horn and contour lines, and must operate from the top by an upward movement.

5. Bars and knuckles shall not be accepted if distorted by improperly matched flasks or any other defects due to molding. They must be free from injurious shrinkage cracks, flaws, checks, sand, sand holes or blow holes. The holes for pivot pins in lugs of bars and knuckles should be drilled or, if cored, must be broached out, and must not be more than 1-16 inch larger than pin, and the rivet holes in the butts must be drilled, or if cored, must be broached out. The holes must be parallel to the face of the bar or knuckle and at right angles to the axis of bar or knuckle. As many bars and knuckles as possible must be cast from the same heat of steel. All parts must be well annealed throughout.

6. The pulling and contact faces of coupler and knuckle must be clean, smooth and at right angles to axis of the bar. The dimensions of butt and shank must be within the limits of variation shown by the company's drawing.

7. The name of coupler must be legibly cast on the top side of head of the bar. Each knuckle and each drawbar must bear a serial number legibly stamped or cast upon it. The knuckle must also bear the name of the coupler and the manufacturer's name or identification mark legibly cast or stamped at some point where it will not be worn off.

8. Every coupler and knuckle made to comply with these specifications must have a slightly raised plate or flat surface cast upon the head in plain view, where it will not be subject to wear. After a lot of complete couplers have successfully passed the inspection and tests prescribed below, the letters M. C. B. must be legibly stamped upon the plate on each coupler and knuckle; this mark to be evidence that the complete coupler is an M. C. B. standard.

INSPECTION.

1. The couplers, after having been thoroughly inspected by the manufacturer to see that they meet the requirements as to interchangeability, soundness and dimensions of parts, etc., herein specified, should be arranged in lots of 101 and 102, so as to provide for the necessary 1,014 couplers and, where possible, care should be taken to put all couplers of the same heat number or numbers in the same lot or lots. The inspector shall

then inspect and gauge each coupler as to its compliance with drawing sizes, and for surface defects and proper contour lines. Any irregularities or swollen parts on the working or bearing faces must be ground or chipped off before the couplers are accepted.

After this inspection the inspector shall select one complete coupler taken at random from each of the lots as provided for above and subject them to test No. 1, hereafter specified. If the coupler fails to stand the prescribed tests but, before failing, stands a sufficient number of blows to make a retest admissible, a second coupler shall be taken from the same lot from which the first coupler was taken. If it stands the test, that lot of couplers shall be accepted as far as test No. 1 is concerned; otherwise that lot of couplers shall be rejected and another lot substituted and tested in the same way.

2. From each 1,004 couplers accepted by test No. 1 four complete couplers shall be selected by the inspector, one of which shall be subject to test No. 2, one to test No. 3 and two to test No. 4, hereafter specified. If any coupler or pair of couplers fails to stand the prescribed test but, before failing, stands a sufficient number of blows to make a retest admissible, a second coupler or pair shall be taken from the same lot or lots from which the first were taken. For instance, if the couplers selected for the test No. 3 have been taken from the fourth one hundred couplers and the failure allows a retest, a second pair shall be taken from the fourth one hundred couplers. If they stand the test, that lot of one thousand couplers shall be accepted as far as that test is concerned; otherwise that lot shall be rejected and another lot of one thousand couplers substituted. Any part of any coupler which has been subjected to test is condemned for service.

PHYSICAL TESTS.

TEST NO. 1.—STRIKING TEST ON CLOSED KNUCKLE OF COMPLETE COUPLER.—As a preliminary, the coupler must be marked on bottom of butt with a center-punched line parallel to axis of shank, this line to extend to the inner face of knuckle (see Fig. 1); the coupler must then be rigidly fixed in the machine in a vertical position, with the axis of coupler in the center line of drop, the pivot pin hole parallel to line through center of legs of the machine and the butt blocked solidly on the anvil to prevent lateral motion by means of steel fillers and wedges, the latter sledged down tight and this sledging repeated after each blow. The heights of support from bottom of butt end should not be greater than 19½ inches.

Blows to be struck directly on knuckle.
Three blows of 1,640 pounds falling five (5) feet.
Three blows of 1,640 pounds falling ten (10) feet.

The coupler shall be considered as having failed to stand this test if it is broken before it has received three blows at 5 feet and three blows at 10 feet, or if any cracks appear more than one inch long or open more

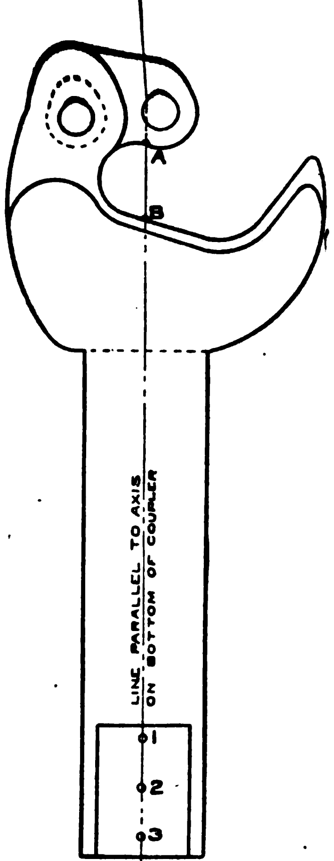


FIG 1.

BEFORE TEST

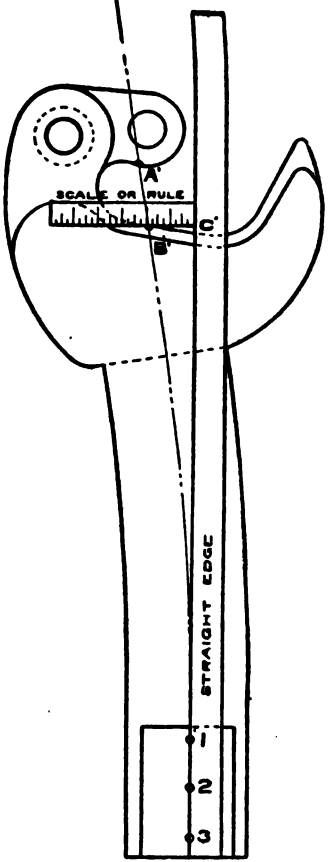


FIG. 2.

AFTER TEST

METHOD OF MEASURING DEFLECTION IN TEST NO
B' C' MEASURES AXIAL DEFLECTION AND MUST NOT EXCEED $1\frac{7}{8}$"
AB-A' B' MEASURES KNUCKLE CLOSURE AND MUST NOT EXCEED $\frac{3}{4}$"

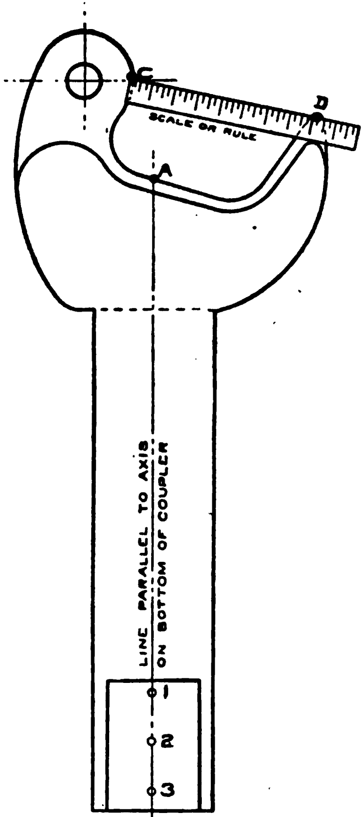


FIG 3.

BEFORE TEST

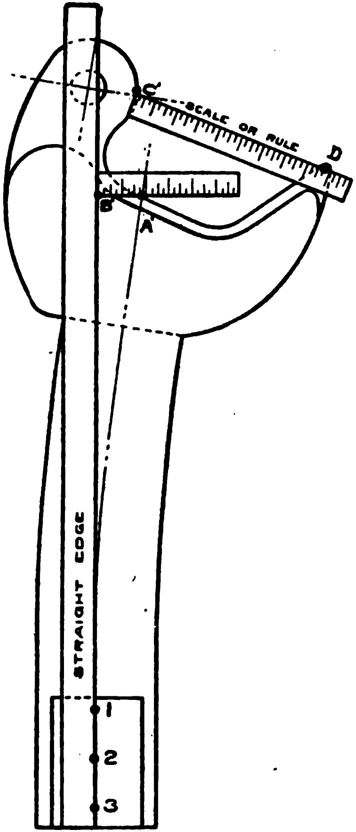


FIG. 4.

AFTER TEST

METHOD OF MEASURING DEFLECTION IN TEST NO 2.
A' B' MEASURES AXIAL DEFLECTION AND MUST NOT EXCEED $1\frac{1}{2}$" FOR
COUPLERS WITH 5"x7" SHANK OR $1\frac{7}{8}$" FOR COUPLERS WITH 5x5" SHANK
C' D' - CD MEASURES GUARD ARM DISTORTION AND MUST NOT EXCEED $\frac{7}{16}$"

than 1-16 inch, or the center-punched line measured at contour is distorted more than 1⅞ inches after having received three blows at 10 feet, or if the knuckle is closed more than ¾ of an inch from its original position when pulled out against the lock by hand after receiving three blows at 5 feet, or if the knuckle will not open, or if the locking device is inoperative after test. For measuring axial distortion and knuckle closure, see Figs. 1 and 2. Should the coupler before failing stand three blows at 5 feet and one blow at 10 feet, another complete coupler shall be provided and tested as per Section 8 governing retest.

TEST NO. 2.—GUARD ARM TEST OF DRAWBAR.—As a preliminary, pivot, knuckle and locking device having been removed, the coupler must be marked on bottom with a center-punched line (see points 1, 2 and 3 in Figs. 3 and 4) parallel to axis of shank and extending to the contour face, a center-punch mark must also be placed at the end of guard arm and on lug (see Fig. 3). The coupler must be blocked rigidly in a vertical position in the machine with steel fillers and wedges, the latter sledged down tight and the sledging repeated after each blow. The butt must rest solidly on the anvil and must be blocked to prevent lateral motion. The edge of guard arm must be on line through centers of legs of machine.

Blows to be struck directly on guard arm.
Three blows of 1,640 pounds falling three (3) feet.
Four blows of 1,640 pounds falling five (5) feet.

The coupler shall be considered as having failed to stand this test if it is broken before it has received three blows at 3 feet and four blows at 5 feet, or if any crack appears more than one inch long or open more than 1-16 inch, or if the center-punched line is distorted more than 1½ inches for 5 in. by 7 in. shank or 1⅞ inches for 5 in. by 5 in. shank couplers, or if the distance between center-punch marks on bottom of head has widened more than 7-16 inch. For method of measuring axial and guard arm deflection, see Figs. 3 and 4. Should the bar before failing stand three blows at 3 feet and two blows at 5 feet, another coupler shall be provided and tested as per Section 8 governing retest.

TEST NO. 3.—JERK TEST OF COMPLETE COUPLERS.—One coupler shall be placed in an inverted position in the yoke forging of test machine and equalizer bar placed so as to rest level, one end in the closed knuckle, the other resting central on the spring follower cap. The weight must strike the equalizer bar midway between the center line of coupler and the center line of the spring follower cap.

Three blows of 1,640 pounds falling five (5) feet.
Three blows of 1,640 pounds falling ten (10 feet.

A coupler shall be considered as having failed to stand this test if it is broken before it has received three blows at 5 feet and three blows at 10 feet, or if cracks appear more than one inch long or open more than 1-16 inch, or if the knuckle is open more than ¾ inch from its original position after third blow at 10 feet, or if the equalizer bar will not stay in place when struck, or if the knuckle will not open, or if the locking device is inoperative after receiving the full test. Should the coupler fail to stand the prescribed test, but stand three blows at 5 feet and one blow at 10 feet, another complete coupler shall be provided and tested as per section 8 governing retest.

Test No. 4.—Pulling Test for Complete Couplers.—Two couplers shall be supported in the machine by yoke forgings and locked together as in running position, with their axis in the same straight line. The couplers must stand a steady pull of 150,000 pounds. A coupler shall be considered as having failed to stand this test if it is broken before it has been pulled the prescribed number of pounds, or if any cracks appear more than one inch long or open more than 1-16 inch, or if the knuckle has opened more than 5/8 inch from its original position when pulled out against the lock. The measurement of knuckle opening must be obtained after the pressure is released. The couplers shall be considered as having failed to stand this test if they slip apart in the machine, or if the knuckle will not open, or if the locking devices are inoperative after above tests. Should either or both couplers fail to stand the prescribed test, but both stand 100,000 pounds, another complete coupler or pair of couplers shall be provided as per Section 8 governing retest.

10. The final failure of any part to meet test shall not condemn the complete coupler but only that part which fails, and such part in all couplers presented shall be replaced, after which the test shall be proceeded with, using new couplers, as if no part of the test had been made.

SPECIFICATIONS FOR SEPARATE KNUCKLES.

In 1904, specifications were adopted as Recommended Practice for separate knuckles, and in 1907 advanced to standard, as follows:

The knuckles furnished under this specification must be made of steel in accordance with the best foundry methods and must not be painted.

1. Knuckles will be subject to the inspection and test of the above named company as to their general condition and strength. The tests and inspection will be made at the place of manufacture, where assistance and labor necessary to make satisfactory and prompt inspection and shipment must be furnished free by the manufacturer. The testing machine and gauges approved by the M. C. B. Association must be used in the test and inspection of knuckles.

2. Knuckles will be ordered as far as practicable in lots of 100; for each 100 ordered the manufacturer shall furnish 102, and in the event of additional knuckles being required to carry out the prescribed tests, they shall be furnished free of cost by the manufacturers.

3. Knuckles must be accurately made to gauges furnished by the manufacturer. These gauges must govern all dimensions representing fitting surfaces, thereby insuring absolute interchangeability without machining.

4. Knuckles shall not be accepted if distorted by improperly matched flasks or any other defects due to molding. They must be free from injurious shrinkage cracks, flaws, checks, sand, sand holes or blow holes. The holes for pivot pins in knuckles should be drilled or, if cored, must be broached out, and must not be more than 1-16 inch larger than 1⅝-inch diameter pivot pin. The holes must be parallel to the face of the knuckle, and at right angles to the axis of knuckle. As many knuckles as possible must be cast from the same heat of steel. All parts must be well annealed throughout.

5. The pulling and contact faces of knuckle must be clean and smooth

6. Each knuckle must bear a serial number and the manufacturer's name or identification mark legibly cast or stamped at some point where it will not be worn off.

7. Every knuckle made to comply with these specifications must have a slightly raised plate or flat surface cast upon the head in plain view, where it will not be subject to wear. After a lot of knuckles have successfully passed the inspection and tests prescribed below the letters M. C. B. must be legibly stamped upon the plate on each knuckle; this mark to be evidence that the knuckle is an M. C. B. standard.

INSPECTION.

The knuckles, after having been thoroughly inspected by the manufacturer to see that they meet the requirements as to interchangeability, soundness and dimensions of parts, etc., herein specified, should be arranged in lots of 102 and, where possible, care should be taken to put all knuckles of the same heat number or numbers in the same lot or lots. The inspector shall then inspect and gauge each knuckle as to its compliance with drawing sizes, and for surface defects and proper contour lines. Any irregularities or swollen parts on the working or bearing faces must be ground or chipped off before the knuckles are accepted.

After this inspection the inspector shall select two knuckles taken at random from the lot or lots as provided for above, and subject one of them to Test No. 1 and the other to Test No. 2, hereafter specified. If one of these knuckles fails to stand prescribed Test No. 1, but before failing, stands a sufficient number of blows to make retest admissible, another knuckle shall be taken from the same lot from which the first knuckles were taken. If it stands the test, that lot of knuckles shall be accepted as far as Test No. 1 is concerned; otherwise that lot of knuckles shall be rejected and another lot substituted and tested in the same way.

The other knuckle selected by the inspector shall be subjected to Test No. 2. If this knuckle fails to stand prescribed Test No. 2, hereafter specified, but before failing, stands a sufficient number of blows to make a retest admissible, another knuckle shall be taken from the same lot from which the first knuckles were taken. If it stands the test, that lot of knuckles shall be accepted; otherwise that lot of knuckles shall be rejected and another lot substituted and tested in the same way.

PHYSICAL TEST.

Test No. 1. Striking Test.

The striking test back block and knuckle supports are placed in the housing against the back and sides, the knuckle dropped in between the supports and held by inserting the pin through the holes in the knuckle supports. The knuckle is then adjusted by means of liners between the back block and the knuckle supports, and between the knuckle supports and the housing. The striking block is then placed in the housing casting resting upon the knuckle. A fitting piece made to suit the type of knuckle is slipped in position between the tail and housing casting so that the striking face of the knuckle is in a horizontal position.

Blows to be struck on striking block through which they are transmitted to knuckle.

Three blows of 1,640 pounds falling four (4) feet.
Three blows of 1,640 pounds falling eight (8) feet.

The knuckle shall be considered as having failed to stand this test if it is broken before it has received three blows at 4 feet and three blows at 8 feet, or if any cracks appear more than 1 inch long or open more than 1-16 inch. Should the knuckle before failing stand three blows at 4 feet and one blow at 8 feet, another knuckle shall be provided and tested as per Section 7 governing retest.

Test No. 2. Jerk Test.

The jerk test back block and knuckle supports are placed in the housing against the back and sides, the knuckle dropped in between the supports and held by inserting the pin through the hole in the knuckle supports. The knuckle is then adjusted by means of liners between the back block and the knuckle supports, and between the knuckle supports and the housing. The striking block is then inserted resting on the inner face of the knuckle, and a block of suitable size inserted between the tail of the knuckle and striking block so that the striking face of the knuckle is in a horizontal position.

If preferred by manufacturers, an old coupler and lock of the same kind, in which the knuckle fits properly, and which may be suitably reinforced in order to endure as many tests as possible, may be used in place of supporting casting for this test.

Blows to be struck on the striking block through which they are transmitted to the knuckle.

Three blows of 1,640 pounds falling three (3) feet.
Two blows of 1,640 pounds falling six (6) feet.

The knuckle shall be considered as having failed to stand this test if it is broken before it has received three blows at 3 feet and two blows at 6 feet, or if any cracks appear more than 1 inch long or open more than 1-16 inch. Should the knuckle before failing stand three blows at 3 feet, another knuckle shall be provided and tested as per Section 7 governing retest.

HEIGHT OF COUPLERS.

The standard height of couplers for passenger equipment cars is 35 inches from top of rail when car is light. Adopted in 1890; see Proceedings 1890 and 1893.

The standard height of couplers for freight cars, measured perpendicular from the level of the tops of rails to center of couplers, adopted in 1893, is 34½ inches, with no greater variation allowable than 3 inches, minimum height 31½ inches. By center of coupler is meant the horizontal line through the center of the coupler shank. See Proceedings 1872, pages 42, 43 and 46; Proceedings 1879, pages 108 and 109; Proceedings 1884, page 30; Proceedings 1896.

ADJUSTING HEIGHT OF COUPLERS.

In 1896 it was decided that in adjusting the height of couplers to meet the requirements of the United States law fixing the height from the top of rail to center of coupler for standard gauge cars in interstate traffic, cars should be adjusted when empty, as far as possible. In order to justify a bill for work done under the Rules of Interchange, an empty car should be adjusted to 34½ inches, or within ¼ inch thereof, and when it is necessary to alter a loaded car it should be adjusted to 33½ inches, or within ¼ inch thereof, or as near as possible to such height as will bring it to 34½ inches when the car is unloaded.

In 1901 this was changed from Recommended Practice to Standard, as a result of letter ballot.

FORM OF WHEEL TREAD AND FLANGE.

Sheet M. C. B. 7.

A form of wheel tread and flange was adopted as a standard of the Association, by letter ballot, in 1886. For action of the Association see Proceedings 1882, pages 178 and 179; Proceedings 1886, page 68.

For flange thickness limits see Sheet M. C. B. 12.

In 1906 a design of wheel tread and flange was adopted as Recommended Practice, having an increase of ⅛ inch on the flange, and a taper in the tread of one in twenty. In 1907 this was advanced to standard, and is shown on Sheet M. C. B. 7.

TERMS AND GAUGING POINTS FOR WHEELS AND TRACK.

Sheet M. C. B. 12.

Standard terms and gauging points for wheels and track were adopted in 1894 as follows. See Sheet M. C. B. 12:

1.— **Track Rails** are the two main rails forming the track.

2.— **Gauge of Track** is the shortest distance between the heads of track rails.

3.— **Base Line**, for wheel gauges, is a line parallel to the axis of the wheels drawn through the point of intersection of tread with a line perpendicular to the axis, and passing through the center of the throat curve.

4.— **Inside Gauge of Flanges** is the distance between backs of flanges of a pair of mounted wheels measured on a line parallel to the base line, but ¼ inch nearer to the axis of the wheels.

5.— **Gauge of Wheels** is the distance between the outside faces of flanges of a pair of mounted wheels measured on a line parallel to the base line, but 17-64 inches farther from the axis of the wheels.

6.— **Thickness of Flange** is the distance measured parallel to the base line between two lines perpendicular thereto, one drawn through the point of measurement of "inside gauge of flanges," and the other drawn through the point of measurement of "gauge of wheels."

7.— **Width of Tread** is the distance measured parallel to the base line from a line perpendicular thereto, drawn through the point of measurement of "gauge of wheels" to the outer edge of tread.

8.— **Check Gauge Distance** is the distance measured parallel to the base line between two lines perpendicular thereto, one drawn through the point of measurement of "inside gauge of flanges" on either wheel, and the other drawn through point of measurement of "gauge of wheels" on mate wheel.

9.— **Over All Gauge** is the distance parallel to base line from outer edge of one wheel to the outer edge of mate wheel.

The above mentioned wheel gauge distances are either directly or by inference as follows:

	Feet.	Inches.
Inside Gauge of Flanges	4	5 7-32
Gauge of Wheels	4	7 11-16
Thickness of Flange	..	1 11-32
Width of Tread	..	4 11-32
Check Gauge Distance	4	6 29-64
Over All Gauge	5	4⅜

GUARD-RAIL AND FROG WING GAUGE.

Sheet M. C. B. 12.

The guard-rail and frog wing gauge shown in Sheet M. C. B. 12 were adopted as standard in 1894, to define the dimensions of track to which M. C. B. standard wheel and flange gauges have been made to conform. Modified 1907.

DISTANCE BETWEEN THE BACKS OF THE FLANGES OF CAR WHEELS.

In 1883 the standard distance between the backs of flanges of car wheels was made 4 feet 5⅜ inches. See Proceedings 1883, pages 55, 118-120.

In 1885 it was decided by letter ballot that in fitting wheels on axles a variation of ⅛ inch each way from the standard distance between flanges would be allowed. See Proceedings 1885, pages 111-119. Drawing revised in 1896.

In 1907 this standard distance was made 4 feet 5⅛ inches, owing to increase in width of wheel flange.

STANDARD REFERENCE GAUGE FOR MOUNTING AND INSPECTING WHEELS, AND CHECK GAUGE.

Sheet M. C. B. 12.

In 1896 a standard reference gauge for mounting and inspecting wheels was adopted by letter ballot to take the place of the check gauge for mounting wheels, formerly shown on Sheet M. C. B. 12, and the gauge for distance between wheels formerly shown on Sheet M. C. B. 7. At same date a standard check gauge was adopted, both as shown on Sheet M. C. B. 12. See Proceedings 1896. In 1907 these were modified

WHEEL FLANGE THICKNESS GAUGES, FOR NEW WHEELS.

Sheet M. C. B. 12.

Maximum and minimum wheel flange thickness gauges for new wheels were adopted as standard in 1894. They are shown in Sheet M. C. B. 12 along with the standard form of wheel tread and flange reproduced from Sheet M. C. B. 7 for easy reference. These gauges admit a variation of 1-16 inch either way from the standard thickness of 1⅜ inches when measured as shown. Such gauges should be used on all new wheels after September 1, 1894, to insure ability to mount them properly to check gauge.

In 1907 a modified form of wheel flange thickness gauges, applicable to the larger wheel tread then a standard, was adopted as standard. They are shown on Sheet M. C. B. 12.

WHEEL DEFECT GAUGE.

Sheet M. C. B. 12.

In 1903 the wheel defect gauge shown in the Rules of Interchange was adopted as a standard. See Sheet M. C. B. 12. Modified 1904, modified 1905, modified 1907.

SAFETY APPLIANCES.

Sheets M. C. B. 19 and 19A to 19P.

In 1893 a Recommended Practice was adopted on safety appliances under the subheads as given. In 1896 some changes were made, especially in regard to handholds, and by the elimination of various details from drawing. In 1902 it was changed to Standard.

In 1905 Sheet M. C. B. 19 was revised to more clearly define the location of safety appliances on cars. Also, the lower round of the end ladder with wooden rails was made straight instead of having an offset.

In 1906 the position of the brake shaft and location of roof handholds were modified.— Proceedings 1906.

In 1907 Sheet 19 was devoted entirely to illustrating these standards.

In 1908 a thorough revision was made of both text and drawings in order to make their meaning and intent clear and adaptable to all existing types of car equipment, and to be capable of but one interpretation.

SAFETY APPLIANCES.—FREIGHT TRAIN CARS.

PREFACE.

Cars of construction not covered specifically in the following sections, relative to handholds, sill steps and ladders, and not shown by the drawings on Sheet M. C. B. 19, shall be considered as of special construction but shall have the same complement of handholds, sill steps and ladders as are required for cars of the nearest approximate type.

BRAKE SHAFTS.

(1) The brake shaft to be located on the end of car, preferably to the left of the center thereof, when facing the end of car. **Brake-shaft location.**

(2) On cars without fixed ends the location of brake shafts to be suitable to the car construction and operation. **On open-end cars.**

(3) The ratchet wheel to be secured from turning on the brake shaft. **Ratchet wheel.**

(4) The brake pawl to be fastened to a suitable casting or plate attached to the car body or brake step. **Brake pawl.**

(5) See Proceedings 1888, pages 25 and 123; Proceedings 1893, 1896, 1907, 1908. **References.**

RUNNING BOARDS.

Running boards.

(1) Box and other house cars to be provided with running boards on roof, not less than 18 inches wide. **Width on house cars.**

(2) Longitudinal running boards on tank cars used in connection with safety railings to be not less than 10 inches. Running boards will not be required on tank cars having floors. **Width on tank cars.**

(3) The ends of all running boards which project more than four inches over the edge of roof of ends of cars to be properly supported. **Projection.**

(4) See Proceedings 1888, pages 24 and 123; Proceedings 1893, 1896, 1907 and 1908. **References.**

Sill steps.

SILL STEPS.

Number and location.

(1) One substantial sill step to be secured to each side of car at the lower right-hand corner, this being the corner on the right, when facing the side of car. The side of the sill step next to the corner to be as near as practicable to the end of the car.

Dimensions.

(2) Sill steps to be made of wrought iron or steel about ½ by 1½ inches cross sectional area or equivalent.

Width.

(3) Sill steps to be about 12 inches long between the sides, measured horizontally at the tread.

Height from rail.

(4) The lower treads of sill steps to be about 24 inches and not more than 32 inches above the rail, the clear depth of sill steps to be not less than 6 inches.

Deep steps.

(5) Sill steps exceeding 18 inches in depth to have an additional tread above the lower tread, and such sill steps to be laterally braced.

Fastenings.

(6) Each side of sill steps on cars to be securely fastened by means of lag screws, bolts or rivets.

References.

(7) See Proceedings 1888, pages 25 and 121; 1893, 1902, 1907 and 1908.

Ladders.

LADDERS.

Number.

(1) Box and other house cars and all cars, the top of which can not be reached from sill steps or platform end sills, shall have two wrought iron or wooden ladders.

Location.

(2) Ladders to be located at diagonal corners, on right-hand end of sides of cars or left-hand side of ends of cars. When cars have platform end sills, ladders may be located near center of ends of cars. High side gondola cars with fixed ends having brake staff platform at one end of car should have ladders and sill steps on both sides at same end of car.

Dimensions.

(3) Ladder treads of wrought iron or steel, to be of ⅝ inch nominal diameter; or of hardwood, to be nominally 1½ by 2 inches, about 16 inches clear length.

Spacing.

(4) The spacing of treads of ladders to be about 18 inches.

Clearance.

(5) All ladder treads shall have a minimum clearance around them of 2 inches, nominal clearance 2½ inches.

Footguard.

(6) When wrought iron or steel ladders without sides are placed on ends of cars with non-projecting end sills, the bottom treads to have a guard or upward projection at inside ends.

Tank-car ladders.

(7) Tank cars having running boards to be provided with suitable ladders to give access to the running boards; the ladders to be located on

right-hand end of sides of cars or left-hand side of ends of cars when running boards are continuous around the car. If running boards are not continuous, ladders to be so located as to give access to each end of each running board. Treads of ladders to be spaced about 18 inches apart.

(8) Arrangements of ladders are shown on Sheet M. C. B. 19, Figs. A, B, C and D, and on detail Sheets M. C. B. 19-A, 19-B, 19-C and 19-D. Drawing references.

(9) See Proceedings 1902, 1906, 1907 and 1908. References.

HANDHOLDS.

Handholds.

(1) Box and other house cars shall have handholds on roofs, in line with each ladder, running parallel with the ladder treads. Roof handholds.

(2) Roof handholds to be placed not less than 2 inches nor more than 18 inches from the edge of the roof and the length to be not less than 10 inches in the clear, unless the construction of the car will not permit.

(3) *Box and other house cars with end ladders* to be provided with a horizontal or vertical handhold, 16 inches in the clear or longer, on each side of each car over sill step; if horizontal side handholds are used they shall be located not more than 30 inches above center line of coupler. Box, etc. Side handholds.

(4) Each end of car to be provided with two horizontal handholds, not less than 12 inches, and preferably 16 inches in the clear, or longer, located not over 30 inches above center line of coupler, or placed under the end sill as near the face as will insure a good, safe fastening, or, if preferred, may be placed on the face of end sill. The coupler unlocking rod, the tread of the ladder or any suitably located part of the car which does not exceed two inches on each side or in diameter, and has the proper clearance, will be considered a suitable end handhold. End handholds.

(5) Arrangement of handholds is shown on Sheet M. C. B. 19, Figs. A and B, and on detail Sheets M. C. B. 19-A and 19-B. Drawing reference.

(6) *Box and other house cars having side ladders* located over sill steps, a tread of such ladder, not over 30 inches above center line of coupler, is an effective handhold. Box, etc. Side handholds.

(7) Each end of car to be provided with two horizontal handholds, not less than 12 inches, and preferably 16 inches in the clear, or longer, located not over 30 inches above center line of coupler or placed under the end sill as near the face as will insure a good, safe fastening, or, if preferred, may be placed on the face of end sill. The coupler unlocking rod, or any suitably located part of the car which does not exceed two inches on each side or in diameter, and has the proper clearance, will be considered a suitable end handhold. End handholds.

(8) Arrangement of handholds is as shown on Sheet M. C. B. 19, Figs. C and D, and on detail Sheets M. C. B. 19-C and 19-D. Drawing reference.

Gondola cars drop ends. Side handholds.

(9) *Gondola cars with drop ends* to be provided with a horizontal or vertical handhold on each side of each car over sill steps, with as much clear length as the car construction will permit, provided same need not exceed 16 inches; and

(10) If horizontal side handholds are used they shall be located not more than 30 inches above center line of coupler.

End handholds.

(11) Gondola cars with drop ends to be provided with two end handholds not less than 12 inches, and preferably 16 inches in the clear, or longer, at each end of car, placed under the end sills as near the face as will insure a good, safe fastening, and as shown on Fig. E, Sheet M. C. B. 19, detail Sheet M. C. B. 19-E; or,

Drawing reference.

(12) If preferred, the end handholds may be placed on the face of end sills, as shown on the alternate illustration, Fig. F, Sheet M. C. B. 19, detail Sheet M. C. B. 19-F.

(13) The coupler unlocking rod when properly located and having proper clearance around it under all conditions, including projecting loads, will be a suitable end handhold.

Gondola cars. Fixed ends. Side handholds.

(14) *Gondola cars with fixed ends* to be provided with a horizontal or vertical handhold, on each side of each car over sill steps, with as much clear length as car construction will permit, provided handholds need not exceed 16 inches in length; and

(15) If horizontal handholds are used they shall be located not more than 30 inches above center line of coupler.

Top-end handholds.

(16) Gondola cars without projecting end sills, having ladders located on sides, to have one vertical or horizontal handhold at upper corner of left-hand side of brake end of car.

Side handholds high cars.

(17) Vertical handhold to extend downward from about 4 inches from top of car; horizontal handhold located about 6 inches from top of car.

End handholds.

(18) Each end of each car to be provided with two horizontal handholds not less than 12 inches, and preferably 16 inches in the clear, or longer, located not over 30 inches above the center line of coupler or placed under the end sill as near the face as will insure a good, safe fastening, or, if preferred, may be placed on the face of the end sill. The coupler unlocking rod, when properly located, and having proper clearance around it, is a suitable end handhold.

Brake-step bracket as handhold.

(19) Exception to be made when the car is provided with a brake step, in which case the bracket of the brake step, if of suitable height, may be used as a handhold on that side of the end of the car, as shown on Fig. G, Sheet M. C. B. 19, detail Sheet M. C. B. 19-G.

(20) The arrangement without brake step is shown on Fig. H, Sheet M. C. B. 19, detail Sheet M. C. B. 19-H.

Drawing references.

(21) High cars with vertical end handholds are shown on Fig. I, Sheet M. C. B. 19, detail Sheet M. C. B. 19-I.

(22) High cars with horizontal side handholds are shown on Fig. J, Sheet M. C. B. 19, detail Sheet M. C. B. 19-J.

Tank-car safety railings.

(23) *All tank cars* to have a safety railing for each running board, not less than 30 inches and not more than 5 feet above platform or above running board. Hand railing may be on the outside of running board, secured to side frame, or may be on the inside of running board, secured to tank or tank bands; or, in case of there being one overhead running board, the hand railing may be secured to top of tank, or tank bands.

Tank-head-top handhold.

(24) Tank cars with end platforms and without hand railings extending around the ends of the tank to have a horizontal handhold of as much length in the clear as the diameter of the tank will permit, secured to each head and located not less than 30 inches and not more than 5 feet above platforms.

Side handholds.

(25) Tank cars to be provided with a horizontal or vertical handhold, 16 inches in the clear or longer, on each side of each car over sill steps. Tank cars having safety railings secured to the tank to be provided with an additional vertical handhold attached to the tank.

Safety-railing posts as handholds.

(26) Tank cars provided with side safety railings, supported by posts which are not more than 2 inches on each side or 2 inches in diameter; the posts are suitable side handholds if located over sill steps.

End handholds.

(27) Tank cars to be provided with two horizontal end handholds, not less than 12 inches, and preferably 16 inches in the clear, or longer, located not over 30 inches above the center line of coupler, and,

(28) If preferred, the end handholds may be placed on the face of the end sills or under the end sills as near the face as will insure a good, safe fastening. The coupler unlocking rod, when properly located and having proper clearance around it, is a suitable end handhold.

Drawing references.

(29) Tank cars with side platform and hand railings secured to side frame to have handholds, as shown on Fig. K, Sheet M. C. B. 19, detail Sheet M. C. B. 19-K.

(30) Tank cars without end sills, the end handholds may be secured to tank heads, or to end running boards on cars so equipped, as shown on Fig. L, Sheet M. C. B. 19, detail Sheet M. C. B. 19-L.

(31) Tank cars without through side sills but having running boards and safety railings secured to tank or tank bands to have handholds, as shown on Fig. M, Sheet M. C. B. 19, detail Sheet M. C. B. 19-M.

Gondola cars drop ends. Side handholds.

(9) *Gondola cars with drop ends* to be provided with a horizontal or vertical handhold on each side of each car over sill steps, with as much clear length as the car construction will permit, provided same need not exceed 16 inches; and

(10) If horizontal side handholds are used they shall be located not more than 30 inches above center line of coupler.

End handholds.

(11) Gondola cars with drop ends to be provided with two end handholds not less than 12 inches, and preferably 16 inches in the clear, or longer, at each end of car, placed under the end sills as near the face as will insure a good, safe fastening, and as shown on Fig. E, Sheet M. C. B. 19, detail Sheet M. C. B. 19-E; or,

Drawing reference.

(12) If preferred, the end handholds may be placed on the face of end sills, as shown on the alternate illustration, Fig. F, Sheet M. C. B. 19, detail Sheet M. C. B. 19-F.

(13) The coupler unlocking rod when properly located and having proper clearance around it under all conditions, including projecting loads, will be a suitable end handhold.

Gondola cars. Fixed ends. Side handholds.

(14) *Gondola cars with fixed ends* to be provided with a horizontal or vertical handhold, on each side of each car over sill steps, with as much clear length as car construction will permit, provided handholds need not exceed 16 inches in length; and

(15) If horizontal handholds are used they shall be located not more than 30 inches above center line of coupler.

Top-end handholds.

(16) Gondola cars without projecting end sills, having ladders located on sides, to have one vertical or horizontal handhold at upper corner of left-hand side of brake end of car.

Side handholds high cars.

(17) Vertical handhold to extend downward from about 4 inches from top of car; horizontal handhold located about 6 inches from top of car.

End handholds.

(18) Each end of each car to be provided with two horizontal handholds not less than 12 inches, and preferably 16 inches in the clear, or longer, located not over 30 inches above the center line of coupler or placed under the end sill as near the face as will insure a good, safe fastening, or, if preferred, may be placed on the face of the end sill. The coupler unlocking rod, when properly located, and having proper clearance around it, is a suitable end handhold.

Brake-step bracket as handhold.

(19) Exception to be made when the car is provided with a brake step, in which case the bracket of the brake step, if of suitable height, may be used as a handhold on that side of the end of the car, as shown on Fig. G, Sheet M. C. B. 19, detail Sheet M. C. B. 19-G.

Drawing references.

(20) The arrangement without brake step is shown on Fig. H, Sheet M. C. B. 19, detail Sheet M. C. B. 19-H.

(21) High cars with vertical end handholds are shown on Fig. I, Sheet M. C. B. 19, detail Sheet M. C. B. 19-I.

(22) High cars with horizontal side handholds are shown on Fig. J, Sheet M. C. B. 19, detail Sheet M. C. B. 19-J.

Tank-car safety railings.

(23) *All tank cars* to have a safety railing for each running board, not less than 30 inches and not more than 5 feet above platform or above running board. Hand railing may be on the outside of running board, secured to side frame, or may be on the inside of running board, secured to tank or tank bands; or, in case of there being one overhead running board, the hand railing may be secured to top of tank, or tank bands.

Tank-head-top handhold.

(24) Tank cars with end platforms and without hand railings extending around the ends of the tank to have a horizontal handhold of as much length in the clear as the diameter of the tank will permit, secured to each head and located not less than 30 inches and not more than 5 feet above platforms.

Side handholds.

(25) Tank cars to be provided with a horizontal or vertical handhold, 16 inches in the clear or longer, on each side of each car over sill steps. Tank cars having safety railings secured to the tank to be provided with an additional vertical handhold attached to the tank.

Safety-railing posts as handholds.

(26) Tank cars provided with side safety railings, supported by posts which are not more than 2 inches on each side or 2 inches in diameter; the posts are suitable side handholds if located over sill steps.

End handholds.

(27) Tank cars to be provided with two horizontal end handholds, not less than 12 inches, and preferably 16 inches in the clear, or longer, located not over 30 inches above the center line of coupler, and,

(28) If preferred, the end handholds may be placed on the face of the end sills or under the end sills as near the face as will insure a good, safe fastening. The coupler unlocking rod, when properly located and having proper clearance around it, is a suitable end handhold.

Drawing references.

(29) Tank cars with side platform and hand railings secured to side frame to have handholds, as shown on Fig. K, Sheet M. C. B. 19, detail Sheet M. C. B. 19-K.

(30) Tank cars without end sills, the end handholds may be secured to tank heads, or to end running boards on cars so equipped, as shown on Fig. L, Sheet M. C. B. 19, detail Sheet M. C. B. 19-L.

(31) Tank cars without through side sills but having running boards and safety railings secured to tank or tank bands to have handholds, as shown on Fig. M, Sheet M. C. B. 19, detail Sheet M. C. B. 19-M.

Flat cars. Side handholds.

(32) *Flat cars* to be provided with a horizontal handhold on each side of each car over sill steps, with as much clear length as the car construction will permit, provided same need not exceed 16 inches.

End handholds and drawing references.

(33) Flat cars to be provided with two end handholds not less than 12 inches, and preferably 16 inches in the clear, at each end of car; placed under the end sills as near the face as will insure a good, safe fastening, and as shown on Fig. N, Sheet M. C. B. 19, detail Sheet M. C. B. 19-N; or,

(34) If preferred, the end handholds may be placed on the face of the end sills, as shown on the alternate illustration, Fig. O, Sheet M. C. B. 19, detail Sheet M. C. B. 19-O; or,

Coupler-unlocking rod as end handhold.

(35) The coupler unlocking rod, when properly located and having proper clearance around it under all conditions, including projecting loads, will be a suitable end handhold.

Hopper-car side handholds.

(36) *Hopper cars* to be provided with horizontal or vertical handholds on each side of each car over sill steps, with as much clear length as the car construction will permit, provided handholds need not exceed 16 inches length in the clear.

(37) If horizontal handholds are used, they shall be located not more than 30 inches above center line of coupler.

High cars.

(38) Hopper cars without platform end sills, having ladders located on sides, to have one vertical or horizontal handhold at upper corner of left-hand side of brake end of car;

(39) Vertical handhold to extend downward from about 4 inches from top of car; horizontal handhold located about 6 inches from top of car.

End handholds.

(40) Each end of hopper cars to be provided with two horizontal handholds not less than 12 inches, and preferably 16 inches in the clear, or longer, located not over 30 inches above center line of coupler, or placed under the end sill as near the face as will insure a good, safe fastening, or, if preferred, may be placed on the face of end sill. The coupler unlocking rod, or a tread of ladder, when properly located and having proper clearance around it, is a suitable end handhold.

Brake-step bracket as handhold.

(41) Exception to be made when the car is provided with a brake step, in which case the bracket of the brake step, if of suitable height, may be used as a handhold on that side of the end of car.

Drawing reference.

(42) Arrangement of handholds is shown on Fig. P, Sheet M. C. B. 19, detail Sheet M. C. B. 19-P.

CABOOSE CARS.

Caboose cars. With platforms.

(43) *Caboose cars* having end platforms, the platform railings and posts will be effective handholds.

Without platforms.

(44) Caboose cars not having end platforms to be equipped with side and end handholds, same as described for box and other house cars.

Side-door handholds and steps.

(45) Caboose cars having side doors, to have vertical handholds on each door post and suitable steps below doorway.

Curved handholds.

(46) Curved hand railings located so as to facilitate catching caboose cars under motion, will be considered as suitable handholds.

HANDHOLD AND LADDER TREAD FASTENINGS, DIMENSIONS AND CLEARANCES.

Through bolts.

(1) All handholds and ladder treads applied on wood to be secured by through bolts or lag screws.

Bolt description.

(2) When bolts are used, they should be not less than ½ inch diameter, with nuts on the outside wherever possible, and riveted over.

Lag screws.

(3) When lag screws are used, they should be not less than ½ inch diameter, 3 inches long, and screwed full length into the wood.

Rivets.

(4) When rivets are used, they should be not less than ½-inch diameter.

Clearance.

(5) All handholds and ladder treads shall have a minimum clearance around them of 2 inches, nominal clearance 2½ inches.

Material.

(6) All handholds and ladder treads made of wrought iron or steel to be of ⅝ inch nominal diameter, or larger.

Coupler unlocking-rod.

(7) The coupler unlocking rod, if properly located and having a minimum clearance of 2 inches around it will be a suitable end handhold.

Brake-step bracket used as a handhold.

(8) Brake step brackets, if properly located and not more than 30 inches above center line of coupler, will be suitable end handholds.

References.

(9) See Proceedings 1879, pages 109, 110, 111; Proceedings 1893, 1894, 1896, 1902, 1907, 1908.

PASSENGER TRAIN CARS.

Railings as handholds.

(1) *Passenger train cars having open end platforms,* platform steps, and platform railings, the railings will be effective handholds.

Wide vestibule side handholds.

(2) *Passenger train cars having wide vestibules,* the side door posts to be equipped with vertical handholds of 16 inches clear length or longer.

Wide vestibule end handholds.

(3) *Passenger train cars having wide vestibules* also to be equipped with end handholds, one on each side of each end of car, with about 16 inches clear length, attached to under side of platform end sill or face of

vestibule; but the body of any handhold should not project beyond vestibule face more than 1 inch.

Non-platform corner handholds.

(4) *Passenger train cars not equipped with platforms* to have at each corner of each car a vertical handhold of 16 inches clear length, or longer.

Steps.

(5) *Passenger train cars with projecting end sills* to have a metal sill step under each corner with tread not higher than 32 inches from the rail.

Hand railing.

(6) *Passenger train cars with projecting end sills* to have end hand railings extending across the ends of the cars, except within end doorways or vestibules, located a suitable height above top of end sills.

End handholds.

(7) *All passenger train cars, excepting open platform cars,* to be equipped with end handholds, one on each side of each end of car, about 16 inches clear length, attached to the end of car on face, or under side of end of car as near the face as will insure a good, safe fastening.

Step dimensions.

(8) Metal sill steps on passenger train cars to be not less than ½ by 1½ inches cross sectional area or equivalent, and to be securely fastened to the car.

Handhold dimensions.

(9) Handholds on passenger train cars to be made of metal of ⅝ inch nominal diameter, and to be securely fastened to the car.

Side-door handholds and steps.

(10) *Passenger train cars without end platforms, but with side doors,* to have vertical handholds and suitable steps below doorway.

PASSENGER CAR PEDESTALS.

For Journals, 3¾ by 7 inches.

Sheet M. C. B. 10.

The pedestal shown on this sheet was recommended in 1874. See Proceedings 1874, page 40; again approved as standard in 1881; see Proceedings 1881, pages 14, 15 and 27. Also approved by the Master Mechanics' Association in the same year. Again adopted as standard in 1893. Weight, 141 pounds.

For Journals, 4¼ by 8 inches. Sheets M. C. B. 20.

In 1898 a Recommended Practice was adopted for passenger car pedestal for journal box with 4¼ by 8 inch journal, and was formerly shown on Sheet M. C. B.— H. In 1901, as a result of letter ballot, this was changed to Standard, and is now shown on Sheet M. C. B. 20.

CENTER PLATES.

Sheet M. C. B. 22.

In 1903 the center plate shown on Sheet M. C. B. 22 was adopted as a standard.

ARCH BARS AND COLUMN BOLT FOR 80,000-POUND CAPACITY CARS.

Sheet M. C. B. 22.

In 1897 a committee on this subject reported designs which were subsequently adopted by letter ballot as Recommended Practice. Proceedings 1897, pages 188 to 192.

In 1901 these were, by letter ballot, changed from Recommended Practice to Standard. Modified 1907. They were formerly shown on Sheet M. C. B.— A, but are now shown on Sheet M. C. B. 22.

In 1907 the following changes were made:

The journal bearing centers spaced to 5 feet 6 inches, the additional four inches being added to the total length.

The spacing of bends increased to 20 inch centers, and the horizontal distance between bends increased to 17½ inches.

The turned up lip on the ends of tie bar was eliminated, the total length of tie bar remaining the same as arch bar, as follows: 78 inches over all.

The addition to Sheet M. C. B. 22 of the following note:

A single nut with nut lock or cotter may be used instead of double nuts.

SIDING, FLOORING, ROOFING AND LINING.

Sheet M. C. B. 24.

In 1901 the following specifications were adopted as standard:

Flooring.

Flooring shall be of three kinds: square-edged, dressed all over; shiplapped, dressed all over; or tongued and grooved, dressed all over, in accordance with section shown on Sheet M. C. B. 24.

Siding, Roofing and Lining.

Siding, roofing and lining shall be of the section shown on Sheet M. C. B. 24.

In 1908 the dimensions of dressed flooring was increased ¼ inch.

In 1908 a drawing was added showing details of flooring 2⅜ inches thick for use on cars for rough freight.

In 1908 drawing was revised to show separate sections for roofing and lining.

UNIFORMITY FOR SECTION OF CAR SILLS.

In 1899 the following finished sizes for sections of longitudinal car sills were adopted as standard of the Association:

For cars such as box, stock, flat, long gondolas, refrigerators, etc., 32 feet and over in length, but under 40 feet:

4 " x 8"
4½" x 8"
5 " x 8"
4 " x 9"
4½" x 9"
5 " x 9"
4 " x 10"
4½" x 10"
5 " x 10"
4½" x 12"
5 " x 12"
5" x 14"

For cars 40 feet long and over, such as furniture and special long gondolas:

4½" x 8"
5 " x 8"
4½" x 9"
5 " x 9"
6 " x 9"
5" x 10"
6" x 10"
6" x 12"
6" x 14"

It is believed that the above recommendations afford a sufficient range of sizes to cover all requirements of design; they are good merchantable sizes, and if used as suggested car repairs will be greatly expedited, as there will be less delay in getting special sizes of lumber, and requisitions for regular sizes can be filled more promptly, as lumbermen can saw in advance of orders with a reasonable certainty of selling their stock.

PIPE UNIONS.

In 1903 the dimensions for pipe unions as shown on accompanying table were adopted as standard.

In 1908 the following specifications were adopted:

That all wrought iron pipe for car work be threaded with a standard total taper of ¾ inch in one foot, and that all pipe fittings be tapped to suit the standard pipe thread with a total taper of ¾ inch in one foot, so that the thread on pipe and fittings will be uniform and taper-tight.

SCREW THREADS, BOLT HEADS AND NUTS.

The Sellers or Franklin Institute system of screw threads, bolt heads and nuts is the standard of the Association, and repeated action of the Association has deprecated the use of any other system and encouraged the careful maintenance of these standards. See Proceedings 1872, pages 18 and 21; Proceedings 1879, pages 82 and 83; Proceedings 1882, page 229.

A set of gauges for standard screw threads and a standard inch scale, 2 feet long, are held in the office of the Secretary for reference.

Mr. Sellers, who proposed this system of screw threads, described it in an essay read before the Franklin Institute of Philadelphia, April 21, 1864, as follows:

"The proportions for the proposed thread and its comparative relation to the sharp and rounded threads, will be readily understood from the accompanying diagram in which Figs. 11 and 12 — the latter on an exaggerated scale — represent a sharp thread, Figs. 13 and 14 a rounded top and bottom to the English proportion, and Figs. 15 and 16 the flat top and bottom, all of the same pitch. The angle of the proposed thread is fixed at 60°, the same as the sharp thread, it being more readily obtained than 55°; and more in accordance with the general practice in this

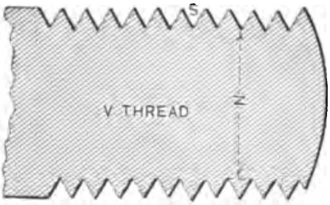


Fig. 11.

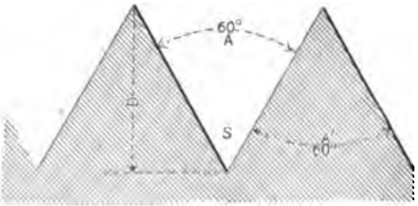


Fig. 12.

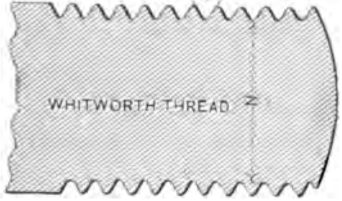


Fig. 13.

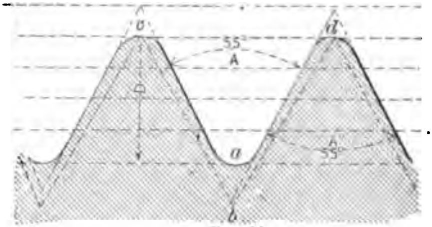


Fig. 14.

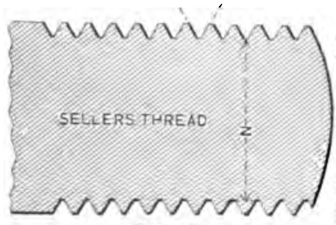


Fig. 15.

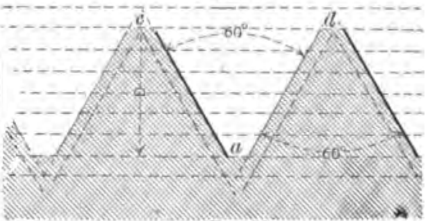


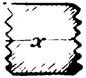
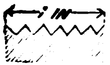
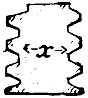
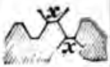
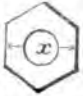
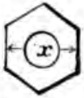
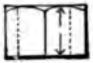
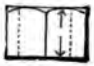
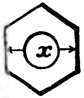
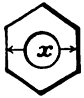
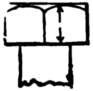
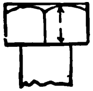
Fig. 16.

country. Divide the pitch, or, which is the same thing, the side of the thread, into eight equal parts, take off one part from the top and fill in one part in the bottom of the thread, then the flat top and bottom will equal one-eighth of the pitch; the wearing surface will be three-quarters of the pitch, and the diameter of screw at bottom of the thread will be expressed by the formula:

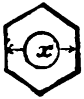
$$\textit{Diameter} - \frac{1{,}299}{\textit{number of threads per inch.}}$$

The accompanying tables are reprinted from Mr. Sellers' essay: they give the proportions of his standard screw threads, nuts and bolt heads:

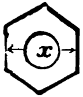
PROPORTIONS FOR SELLERS' STANDARD SCREW-THREADS, NUTS AND BOLTS.

Screw-Threads.				Nuts.				Bolt Heads.			
Diameter of screw.	Threads per inch.	Diameter at root of thread.	Width of flat.	Short diameter rough.	Short diameter finish.	Thickness rough.	Thickness finish.	Short diameter rough.	Short diameter finish.	Thickness rough.	Thickness finish.
											
1/4	20	.185	.0062	1/2	7/16	1/4	3/16	1/2	7/16	1/4	3/16
5/16	18	.240	.0074	19/32	17/32	5/16	1/4	19/32	17/32	19/64	1/4
3/8	16	.294	.0078	11/16	5/8	3/8	5/16	11/16	5/8	11/32	5/16
7/16	14	.344	.0089	25/32	23/32	7/16	3/8	25/32	23/32	25/64	3/8
1/2	13	.400	.0096	7/8	13/16	1/2	7/16	7/8	13/16	7/16	7/16
9/16	12	.454	.0104	31/32	29/32	9/16	1/2	31/32	29/32	31/64	1/2
5/8	11	.507	.0113	1 1/16	1	5/8	9/16	1 1/16	1	17/32	9/16
3/4	10	.620	.0125	1 1/4	1 3/16	3/4	11/16	1 1/4	1 3/16	5/8	11/16
7/8	9	.731	.0138	1 7/16	1 3/8	7/8	13/16	1 7/16	1 3/8	23/32	13/16
1	8	.837	.0156	1 5/8	1 9/16	1	15/16	1 5/8	1 9/16	13/16	15/16
1 1/8	7	.940	.0178	1 13/16	1 3/4	1 1/8	1 1/16	1 13/16	1 3/4	29/32	1 1/16
1 1/4	7	1.065	.0178	2	1 15/16	1 1/4	1 3/16	2	1 15/16	1	1 3/16
1 3/8	6	1.160	.0208	2 3/16	2 1/8	1 3/8	1 5/16	2 3/16	2 1/8	1 3/32	1 5/16
1 1/2	6	1.284	.0208	2 3/8	2 5/16	1 1/2	1 7/16	2 3/8	2 5/16	1 3/16	1 7/16
1 5/8	5 1/2	1.389	.0227	2 9/16	2 1/2	1 5/8	1 9/16	2 9/16	2 1/2	1 9/32	1 9/16
1 3/4	5	1.491	.0250	2 3/4	2 11/16	1 3/4	1 11/16	2 3/4	2 11/16	1 3/8	1 11/16
1 7/8	5	1.616	.0250	2 15/16	2 7/8	1 7/8	1 13/16	2 15/16	2 7/8	1 15/32	1 13/16
2	4 1/2	1.712	.0277	3 1/8	3 1/16	2	1 15/16	3 1/8	3 1/16	1 9/16	1 15/16

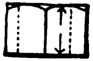
PROPORTIONS FOR SELLERS' STANDARD NUTS AND BOLTS.



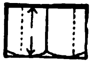
Rough Nut = one and one-half diameter of bolt + $\frac{1}{8}$.



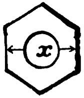
Finished Nut = one and one-half diameter of bolt + $\frac{1}{16}$.



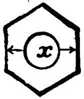
Rough Nut = diameter of bolt.



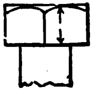
Finished Nut = diameter of bolt — $\frac{1}{16}$.



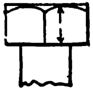
Rough Head = one and one-half diameter of bolt + $\frac{1}{8}$.



Finished Head = one and one-half diameter of bolt + $\frac{1}{16}$.



Rough Head = one-half distance between parallel sides of head.



Finished Head = diameter of bolt — $\frac{1}{16}$

NOTE. — In 1899 the following dimensions for square bolt heads were adopted as recommended practice: The side of the head shall be one and one-half times the diameter of the bolt, and the thickness of the head shall be one-half the side of the head. See Recommended Practice. In 1900 these dimensions were adopted as standard.

SQUARE BOLT HEADS.

In 1899 the following dimensions for square bolt heads were adopted as Recommended Practice:

The side of the head shall be one and one-half times the diameter of the bolt, and the thickness of the head shall be one-half the side of the head.

In 1900 these dimensions were adopted as a Standard.

STENCILING CARS.

In 1896 it was decided:

That on all box cars standing more than twelve (12) feet from top of rail to eaves, the height and width at eaves be stenciled in 3-inch letters on side of car, as near the bottom as convenient.

That all classes of cars have size of coupler, style of rear attachments, kind of draft gear and style of brake beams stenciled in 2 or 3-inch letters on each side of car at opposite ends, or on each end of car directly above coupler, where design of car permits it. Where the kind of draft gear implies the style of rear attachments, the marking for the latter may be omitted.

That where the construction of the truck permits, trucks shall be stenciled on each side, giving the size of journal, and the letters "M. C. B." if the axle is M. C. B. standard axle. If the axle is not M. C. B. standard, use dimensions from center to center of journal in place of M. C. B. This stenciling to be in 1 or 2-inch letters, and to be put on end or side of bolster in Diamond trucks, and on side truck frame in center on pedestal type of trucks.

Initials of the road should also appear in letters 1 or 2 inches high on one side of bolster or transom of each truck.

In 1901 this was changed from Recommended Practice to Standard, as a result of letter ballot. Modified in 1906 by the elimination of fractional sizes of figures and letters. Modified in 1908.

M. C. B. REPORTS.

In 1893 a standard size of 6 inches by 9 inches was adopted for M. C. B. reports. See Proceedings 1893.

PAMPHLETS, CATALOGUES, SPECIFICATIONS, ETC.

In 1894 standard sizes for publications of this nature were adopted and the size of postal card circular was changed in 1895 so that they are now as follows:

For postal card circulars, 3½ inches by 5½ inches.

For pamphlets and trade catalogues { 3½ inches by 6 inches.
6 inches by 9 inches.
9 inches by 12 inches.

For specifications and letter paper, 8¼ inches by 10¾ inches.

In connection with these standards it was decided that a standard practice should be to have the proper standard dimensions, and the word "standard" printed on the upper left-hand corner of title-page or cover whenever practicable.

RULES FOR LOADING MATERIALS.

Sheet M. C. B. 25, 25-A and 25-B.

In 1893 a Recommended Practice was adopted for loading logs and poles on cars and for racking cars for loading bark, and in 1896 extended rules governing the loading of lumber and timber on open cars were adopted, replacing the former practice heretofore shown on Sheet M. C. B. — B, with the exception of racking cars for loading bark. At the same time rules governing the loading of long structural material, rails, plates, girders, etc., were adopted.

In 1897 some modification of these rules was adopted, with slight changes in the illustrations also. In 1898 still further slight changes were made in the text and in some of the drawings, and a new section was added containing rules for loading large logs, pipe and stone on open cars. In 1900 a further modification was made in both text and illustrations.

Further revision, 1904; also, 1905; also, 1906.

In 1908 a further revision was made, and the rules advanced to Standard. See Sheets M. C. B. 25, 25-A and 25-B.

A separate pamphlet is issued by the Association containing these rules.

RECOMMENDED PRACTICE.

SPECIFICATIONS FOR IRON AXLES.

In 1899 the following specifications, including tests for iron axles, were adopted as Recommended Practice:

Car axles for the use of this company will be ordered subject to the following conditions:

1. All axles must conform in shape and size to the dimensions shown on the blue-prints, which will be furnished by the.............. R. R. Co.

2. All axles must be cut off and faced to exact lengths, and be centered with 60 degree centers in the manner indicated in blue-prints, so as to prevent lathe centers from bottoming. Axles must be made of double-work fagoted scrap, 16 per cent of new bar iron worked into the center of the axles being allowed if desired. Axles must be well hammered and free from any clearly defined open seams. They must finish in the lathe with journal free from flaws in the shape of holes, pieces shelled out, or

open seams large enough, so that with a knife blade scale or dirt can be removed from such seams, or open seams showing a clear opening of 1-32 inch or over, and being more than 1 inch long. The maker's name or initials must be stamped plainly on each axle.

3. All axles are to be inspected and tested at the works where they are made. The............shall be notified when they are ready for inspection. Under no circumstances shall car axles be shipped from the works where they are made until they have been tested, inspected and accepted by a proper representative of the company.

4. For each one hundred axles or fraction thereof ordered, one additional axle must be furnished for test. This axle will be selected at random from the pile, and subjected to the prescribed drop test for iron axles of its class. If it stands the test the one hundred axles, or fractional part thereof that it represents, will be inspected, and only those accepted that are made in a workmanlike manner and are free from defects mentioned in these specifications. All axles received are subject to rejection if they do not finish in the lathe in accordance with the requirements herein given. The manufacturer must furnish, free of charge, the axles that are to be tested, the testing apparatus, and the assistance necessary to enable the inspector to make a satisfactory inspection and test. Axles will not be accepted if the diameters fall below the dimensions for forged sizes given in the blue-prints, or if exceeding those dimensions by more than ⅛ inch. Car axles in the rough must not have less than the prescribed minimum weight, nor more than the prescribed maximum weight for axles of their class.

AXLE DROP TEST.

5. All axles will be tested physically by drop test. The testing machine must conform in its essential parts to the drawings adopted by the Master Car Builders' Association. These essential parts are: The points of supports on which the axle rests during tests must be three (3) feet apart from center to center; the tup must weigh 1,640 pounds; the anvil, which is supported on springs, must weigh 17,500 pounds; it must be free to move in a vertical direction; the springs upon which it rests must be twelve in number, of the kind described on drawing, and the radius of the supports and of the striking face on the tup in the direction of the axis of the axle must be five (5) inches. When an axle is tested it must be so placed in the machine that the tup will strike it midway between the ends, and it must be turned over after the first and third blows, and when required after the fifth blow. After the first blow the deflection of the axle under test will be measured in the manner specified below.

6. It is desired that the axles when tested as specified above shall stand the number of blows at the heights specified in the following table without rupture, and without exceeding, as the result of the first blow, the deflections given:

AXLE.	NO. BLOWS.	HEIGHT OF DROP.	DEFLECTION.
M. C. B. 4¼ by 8 inch journals....	5	21½ ft.	7⅛ in.
M. C. B. 5 by 9 inch journals......	5	29 ft.	6 1/16 in.
M. C. B. 5½ by 10 inch journals...	5	36 ft.	5 7/16 in.

7. Axles will be considered as having failed on drop test and will be rejected if they rupture or fracture in any way, or if the deflection resulting from the first blow exceeds the following:

M. C. B. axle, 4¼ by 8 inch journals......	8 1-8 inches.
M. C. B. axle, 5 by 9 inch journals.........	8 1-16 inches.
M. C. B. axle, 5½ by 10 inch journals......	6 1-16 inches.

In order to measure the deflection, prepare a straight-edge as long as the axle by reinforcing it on one side, equally at each end, so that when it is laid on the axles the reinforced parts will rest on the collars of the axle, and the balance of the straight-edge not touch the axle at any place. Next place the axle in position for test, lay the straight-edge on it, and measure the distance from the straight-edge to the axle at the middle point of the latter. Then, after the first blow, place the straight-edge on the now bent axle in the same manner as before, and measure the distance from it to that side of the axle next to the straight-edge at the point farthest away from the latter. The difference of the two measurements is the deflection.

SPECIFICATIONS FOR STEEL AXLES.

Sheet M. C. B. — A.

In 1899 the following specifications, including tests for steel axles, were adopted as Recommended Practice:

1. Axles will be ordered not less than 100 on one order. All axles must be made and finished in a workmanlike manner, and must be free from cracks, or seams, or flaws which can be detected by the eye. All parts must be rough turned, except at point "A" on diagram below.

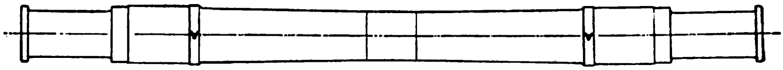
2. All axles must be made of steel, and the material desired have the following composition:

Carbon	0.40 per cent.
Manganese, not above.....................	0.50 per cent.
Silicon	0.05 per cent.
Phosphorus, not above....................	0.05 per cent.
Sulphur, not above.......................	0.04 per cent.

3. All axles must conform in sizes, shapes and limiting weights to the requirements given on the order or print sent with it. The rough turning must be done with a tool so shaped as to leave the surface free from ridges; and in centering them 60-degree centers must be used with proper clearance for lathe centers. All axles must be legibly stamped when

offered for test, on the unfinished portion, "A" on diagram below, with the blow or heat number and the date, and on the cylindrical portion at center they must be stamped with the name of the maker.

Portions marked "A" to be unfinished and to have stamped upon either of them blow number and date.



4. Manufacturers must notify.. when they are ready to ship not less than 100 axles; must have all the axles made from each heat, and no others, in a pile by themselves; must furnish the testing machine referred to in Section 6, and the proper appliances for checking the dimensions and weights; must have a car or cars ready to receive shipment; must furnish the labor and power necessary to enable the inspector to promptly inspect and test; and ship or store the axles when tests are finished. Axles which, when offered for test, are so rusty as to hide defects will not be considered.

5. A shipment of axles being ready for test, the inspector will first make a list of the heat numbers in the various piles of axles offered, and the number of axles bearing the same heat number in each pile. If he finds in any pile axles bearing different heat numbers he must, before going further, have the pile rearranged, so that only those axles having the same heat number will be in the same pile. Also, if he finds in any pile any axles having evidence of changed or defaced heat numbers, or any axles having heat numbers not clearly legible, or any bearing heat numbers previously rejected, he will exclude such axles from further consideration. He will then examine the axles in each pile or heat, as to workmanship and defects visible to the eye, and as to whether they conform to dimensions and directions on the order, or tracing, or in these specifications. All axles not satisfactory in these respects must be laid aside and will not be further considered. This being done, if less than thirty axles in any heat are left, he will refuse to consider that heat further. If in this inspection defects are found which the manufacturer can remedy while the inspector is at the works, he may allow such defects to be cured and may count the axles which are successfully treated in this way as a part of the thirty above mentioned. Not less than thirty axles from any one heat having passed the foregoing inspection, the inspector will select from each pile or heat, one axle at random, and subject it to the physical test prescribed for such axles as may be under consideration. If the test axle fails to fill the physical requirements, all the axles from that heat of steel will be regarded as rejected, and none of them will at any time be considered again. If the test axle passes physical test, the inspector will draw a straight line parallel with the axis of this test

axle ten (10) inches long, starting from one end of it, and prick-punch this line at several points. He will then have a piece about six (6) inches long cut off from the same axle, so as to leave some of the prick-punch marks on each piece of the axle. The 6-inch piece must be sent at once, properly tagged, to...................... The piles of axles which have passed physical test will be allowed to remain as the inspector leaves them, until the results of the chemical test are known. The 6-inch piece being received at the laboratory, a line will be drawn from the prick-punch line above described, through the center of the axle across the cut-off end, and a prick-punch mark made on this last line, 40 per cent of the distance from the center to the circumference of the axle. Borings for analysis will be taken by means of a ⅝-inch diameter drill, acting parallel to the axis of the axle, and starting with its center in the last described prick-punch mark. The borings will be analyzed in accordance with standard methods, and the results of analysis will be communicated to the inspector, who will at once proceed to the works, and reject, or accept and ship, or mark and store, as the case may be, the axles in question. If the analysis of any test axle shows that the steel does not meet the chemical requirements, all of the axles of that heat will be regarded as rejected, and none of them will at any time be considered again. If the analysis of any test axle shows that the steel meets the chemical requirements, all of the axles of that heat which have passed inspection and physical test will be regarded as accepted. The inspector will proceed to load and ship from the accepted axles as many as may be required to fill the order. If, as the result of inspection and the physical and chemical tests, more axles are accepted than the order calls for, such accepted axles in excess will be stamped by the inspector with his own name, and will then be piled and allowed to remain at the works, subject to further orders from the purchasing agent. On receipt of further orders, axles once accepted will, of course, not be subject to further test, but in no case will even accepted axles be loaded and shipped except in the presence of the inspector. In all cases the inspector will keep an accurate record of the heat numbers, of the number of axles in each heat which are rejected, or stored, and will transmit this information with each report.

6. All axles will be tested physically by drop test. The testing machine must conform in its essential parts to the drawings adopted by the Master Car Builders' Association. These essential parts are: The points of supports on which the axle rests during tests must be three feet apart from center to center; the tup must weigh 1,640 pounds; the anvil, which is supported on springs, must weigh 17,500 pounds; it must be free to move in a vertical direction; the springs upon which it rests must be twelve in number, of the kind described on drawing; and the radius of supports and of the striking face on the tup in the direction of the axis of the axle must be five (5) inches. When an axle is tested it must be so placed in the machine that the tup will strike it midway between the ends, and it must be turned over after the first and third blows, and

when required, after the fifth blow. After the first blow, the deflection of the axle under test will be measured in the manner specified below.

7. It is desired that the axles, when tested under the drop test as specified above, shall stand the number of blows at the height specified in the following table without rupture and without exceeding as the result of the first blow the deflections given:

AXLE.	NO. BLOWS.	HEIGHT OF DROP.	DEFLECTION.
M. C. B. 4¼ by 8 inch journals for 60,000-pound cars.............	5	34 feet	7 inches
M. C. B. 5 by 9 inch journals for 80,000-pound cars..............	5	43 "	5¾ "
M. C. B. 5½ by 10 inch journals for 100,000-pound cars.........	7	43 "	4 "

8. Axles will be considered as having failed on physical test and will be rejected if they rupture or fracture in any way, or if the deflection resulting from the first blow exceeds the following:

M. C. B. axle, 4¼ by 8 inch journals.........	7½ inches.
M. C. B. axle, 5 x 9 inch journals............	6¼ inches.
M. C. B. axle, 5½ by 10 inch journals........	4½ inches.

9. Axles will be considered to have failed on chemical test and will be rejected if the analysis of the borings taken as above described gives figures for the various constituents below, outside the following limits, namely:

Carbon.......	below 0.35 per cent, or above 0.50 per cent.
Manganese	above 0.60 per cent.
Phosphorus	above 0.07 per cent.

In order to measure the deflection, prepare a straight-edge as long as the axle, by reinforcing it on one side, equally at each end, so that when it is laid on the axle, the reinforced parts will rest on the collars of the axle, and the balance of the straight-edge not touch the axle at any place. Next place the axle in position for test, lay the straight-edge on it and measure the distance from the straight-edge to the axle at the middle point of the latter. Then, after the first blow, place the straight-edge on the now bent axle in the same manner as before, and measure the distance from it to that side of the axle next to the straight-edge at the point farthest away from the latter. The difference in the two measurements is the deflection.

SPECIFICATIONS FOR KNUCKLE PIVOT PINS.

In 1907 the following specifications for Knuckle Pivot Pins were adopted as Recommended Practice:

"All knuckle pivot pins ordered under these specifications must be made from open-hearth steel properly forged and then annealed, and must not be painted.

1. Knuckle pivot pins will be subject to the inspection and test of the above-named company as to their general condition and strength. The test and inspection will be preferably made at the place of manufacture where assistance and labor necessary to make satisfactory and prompt inspection and shipment must be furnished free by the manufacturer. The testing machine, approved by the M. C. B. Association, must be used in the test of knuckle pivot pins.

"2. Knuckle pivot pins will be ordered as far as practicable in lots of 500; for each lot ordered the manufacturer shall furnish three extra pins, and in the event of additional pins being required to carry out the prescribed tests, they shall be furnished free of cost by the manufacturer.

"3. All pins must be of such size as will enter the plus end and will not enter the minus end of a limit gauge for 1⅝-inch round iron as prescribed in M. C. B. Recommended Practice under 'Limit Gauges for Round Iron,' and must not vary more than ⅛ inch above or below the proper length. The lower end of the pin must be cut off square and have at least ¼-inch bevel or chamfer. The cotter-pin hole to be properly drilled for ⅜ inch cotter. The head must be well formed, and pins which are not straight and true and those which have blisters or surface defects of any kind will be rejected.

INSPECTION.

"Knuckle pivot pins, after having been thoroughly inspected by the manufacturer to see that they meet the requirements as to interchangeability, soundness, dimensions of parts, etc., herein specified, should be arranged in lots of 503. The inspector shall then inspect and gauge each pin as to its compliance with drawing sizes and for surface defects.

"After this inspection the inspector shall select three pins taken at random from each lot or lots, as provided for above, and subject them to the cross-bending drop test as hereafter specified. If one of the pins fails to stand the test as prescribed below, and the other two pass, three more pins shall be selected at random from the same lot from which the first pins were taken; if all three of these pins stand the prescribed test, that lot of pins shall be accepted, otherwise that lot of pins shall be rejected, and another lot substituted and tested in the same way. If two or more pins fail to stand the test, originally, the lot represented will be rejected without further consideration.

PHYSICAL TEST.

"The cross-bending test will be made in a standard M. C. B. drop-testing machine, the pins resting on rounded supports, held rigidly 10 inches center to center, to be subjected to a blow by the weight falling a height of three feet. The blow of the weight should be transmitted to the specimen by a block having a round lower edge resting on the specimen. The radius of all these round edges is to be ¾ inch. All pins are to be tested cold, and must not show any cracks or fractures. The bend must be directly under the nose of the plunger. Pins will be rejected if they break, or crack, or show a deflection less than 15 degrees or greater than 35 degrees."

CAST-IRON WHEELS.

Sheet M. C. B. — J.

In 1904 the designs of wheels shown on Sheet M. C. B. — J, for cars of 60,000 pounds, 80,000 pounds and 100,000 pounds capacity, were adopted as Recommended Practice. Revised 1907.

SPECIFICATIONS FOR 33-INCH CAST-IRON WHEELS.

In 1896 a committee was appointed to revise the specifications and guarantees for cast-iron wheels. It reported to the convention in 1897, but its recommendations were not submitted to letter ballot and, therefore, not adopted by the Association. In 1899, the committee made a revised report on the specifications, the recommendations of which were adopted as Recommended Practice.

In 1904 revised specifications were presented by a committee, and upon being submitted to letter ballot were adopted as Recommended Practice. Revised 1907.

FOR 33-INCH CAST-IRON WHEELS HAVING A MINIMUM WEIGHT OF 600, 650 AND 700 POUNDS. FOR CARS OF 60,000, 80,000 AND 100,000 POUNDS CAPACITY.

1. Chills must have the same inside profile as shown by M. C. B. drawings of wheel tread adopted in 1906. The inside diameter of chill must be the M. C. B. standard of 33½ inches, measured at a point 2⅝ inches from outside of tread of wheel.

2. Wheels of the same normal diameter must not vary more than one-fourth (¼) of an inch above or below the mean size measured on the circumference, and the same wheel must not vary more than one-sixteenth (1-16) of an inch in diameter. The body of the wheel must be smooth and free from slag, shrinkage or blowholes. The tread must be free from deep and irregular wrinkles, slag, chill cracks and sweat or beads in throat, and swollen rims.

3. The wheels must show clean gray iron in the plates, except at chaplets, where mottling to not more than one-half (½) inch from same will be permitted. The depth of pure white iron must not exceed one (1) inch nor be less than one-half (½) inch in the middle of the tread. It shall not exceed one (1) inch in the middle of the tread nor be less than three-eighths (⅜) inch in the throat, for wheels having a maximum weight of six hundred (600) pounds. It shall not exceed one (1) inch in

the middle of the tread nor be less than seven-sixteenths (7-16) inch in the throat for wheels having a minimum weight of six hundred and fifty (650) pounds, and shall not exceed one (1) inch in the tread nor be less than one-half (½) inch in the throat for wheels having a minimum weight of seven hundred (700) pounds. The depth of white iron shall not vary more than one-fourth (¼) of an inch around the tread on the rail line in the same wheel.

4. When ready for inspection, the wheels must be arranged in groups, all wheels of the same date being grouped together, and for each hundred wheels which pass inspection and are ready for shipment, two representative wheels shall be taken at random, one of which shall be subjected to the following tests:

The wheels shall be placed flange downward on an anvil block, weighing not less than seventeen hundred (1700) pounds, set on rubble masonry at least two (2) feet deep, and having three supports not more than five (5) inches wide to rest upon. It shall be struck centrally on the hub by a weight of two hundred (200) pounds. For wheels having a minimum weight of six hundred (600) pounds, ten (10) blows falling from a height of nine (9) feet. For wheels having a minimum weight of six hundred and fifty (650) pounds, twelve (12) blows falling from a height of ten (10) feet, and for wheels having a minimum weight of seven hundred (700) pounds, twelve (12) blows falling from a height of twelve (12) feet. Should the test wheel stand the given number of blows without breaking in two or more pieces, the Inspector will then subject the other wheel to the following test:

The wheel must be laid flange down in the sand and a channel way one and one-half (1½) inches wide and four (4) inches deep must be molded with green sand around the wheel. The clean tread of the wheel must form one side of the channel way, and the clean flange must form as much of the bottom as its width will cover. The channel way must then be filled to the top with molten cast iron, which must be hot enough, when poured, so that the ring which is formed when metal is cold shall be solid or free from wrinkles or layers. The time when the pouring ceases must be noted, and two minutes later an examination of the wheel must be made. If the wheel is found broken in pieces, or if any crack in the plate extends through or into the tread, the one hundred wheels represented by the tests will be rejected.

5. In case of the drop tests, should the test wheel break in two or more pieces with less than the required number of blows, then the second wheel shall be taken from the same lot and similarly tested. If the second wheel stands the test it shall be optional with the Inspector whether he shall test the third wheel or not; if he does not do so, or if he does, and the third wheel stands the test, the hundred wheels shall be accepted as filling the requirements of the drop test.

6. The lower face of the weight of two hundred (200) pounds shall be eight (8) inches in diameter, and have a flat face.

7. The thickness of the flange shall be regulated by the maximum and minimum flange thickness gauges adopted by the M. C. B. Association in 1907.

8. All wheels must be numbered consecutively in accordance with instructions from the railroad company purchasing them, and shall have the number, the normal weight of the wheel, also the day, month and year when made plainly formed on the inside plate in casting, and no two wheels shall have the same number. All wheels shall also have the name of the maker and place of manufacture plainly formed on the outside plate in casting.

Wheels made to conform to these specifications should also be plainly marked M. C. B. 1907.

9. Individual wheels will not be accepted which

(1) Do not conform to standard design and measurements.
(2) Are under weight.
(3) Have physical defects described in Section 2.

Any lot of one hundred wheels submitted to test will not be accepted

(1) If wheels broken do not meet the prescribed drop test.
(2) If the wheel tested does not stand the thermal tests.
(3) If the conditions prescribed in Section 3 are not complied with.

10. All wheels must be taped with M. C. B. standard design of wheel circumference tape having numbers 1, 2, 3, 4, 5 stamped one-eighth (1/8) inch apart, the figure three (3) to represent the normal diameter, 103.67 inches circumference, the figure one (1) the smallest diameter and the figure five (5) the largest diameter.

TANK CARS.

In 1903 a report was submitted embodying certain specifications for the repairs of old equipment and the construction of new equipment. These specifications were submitted to letter ballot and adopted as a Recommended Practice.

In 1906 these specifications were modified; also, in 1907. In 1908 a further revision was made.

The modified specifications are as follows:

TANK CARS.

Requirements for Tank Cars.

Tank cars offered for movement over the lines of a railroad must conform to the following general and detail specifications:

GENERAL SPECIFICATIONS.

Damage by Fire.—Tanks which bear evidence of damage by fire must be withdrawn from transportation service.

TRUCKS SIZE OF AXLES. — Each truck must have a strength equal to or greater than the strength of the axles used.

Sizes of axles must conform to rule relating to axles in M. C. B. Rules of Interchange for Freight Cars, which have been modified as below, to make them applicable to tank cars.

TABLE I.

FOR TANK CARS MARKED LIMIT WEIGHT I.

Limit Weight I in lbs.	Journal.	Wheel Seat.	Center.
161,000......	5 inches	6¾ inches	5⅞ inches
132,000......	4½ “	6¼ “	5 5-16 “
112,000......	4 “	5⅝ “	4⅞ “
95,000......	3¾ “	5 “	4⅜ “
79,000......	3½ “	4¾ “	4⅛ “
66,000......	3¼ “	4⅝ “	3⅞ “
58,000......	3 “	4¼ “	3½ “

TABLE II.

FOR TANK CARS MARKED LIMIT WEIGHT II.

Limit Weight II in lbs.	Journal.	Wheel Seat.	Center.
161,000......	5 inches	6¾ inches	5⅞ inches
132,000......	4½ “	6¼ “	5⅜ “
112,000......	4¼ “	6 “	5¼ “
95,000......	3¾ “	5½ “	4¾ “
79,000......	3½ “	5¼ “	4⅝ “
66,000......	3¼ “	4⅞ “	4¼ “
58,000......	3 “	4¾ “	4⅛ “

All tank cars to have Limit Weight I or Limit Weight II stenciled on them.

AXLES.—New steel underframe tank cars built hereafter must have axles to meet requirements of Table No. 2 and car stenciled Limit Weight No. II.

Existing tank cars built prior to this date must have axles to at least meet requirements of Table No. 1, and preferably Table No. 2; and be stenciled "Light Weight I" if the axles conform to Table No. 1; or "Light Weight II" if the axles conform to Table No. 2. When all the axles under any car are changed to meet the requirements of Table No. 2, the stenciling must be changed from "Limit Weight I" to Limit Weight II, to protect the tank car owner when renewals of wheels or axles are made in repairs.

BRAKES.— Each car must be equipped with air brakes of a capacity equal to not less than seventy per cent of the light weight of car, and at least one hand brake operating the brakes on both trucks.

SAFETY APPLIANCES.— Each end of car must be provided with the necessary steps, grabirons, etc., to comply with the requirements of the M. C. B. Association. Each tank car must be provided with substantial and adequate hand railing securely fastened and applied, as shown in the Standards of the M. C. B. Association. Where, from the construction of a car, a side hand railing is inadmissible and therefore involves an overhead running-board and high brake staff, each end of car must be provided with ladders to comply with the requirements of the M. C. B. Association.

PUSH-POLE POCKETS.— There shall be a push-pole pocket at every corner of the car. Where, from the construction of the car, the push-pole pockets can not well be placed on the body, they must be applied to the trucks, so placed above the journal boxes that the push pole will push toward the center of the truck.

DOME YOKES, TANK STRAPS, ETC.— Tanks must be secured from turning on the underframes, either by center anchors riveted to the tank and underframe, or by means of dome yokes, and must also be secured to underframe by means of tank straps, two for tanks not more than 76 inches in diameter, and four for tanks of greater diameter. The center anchors may be made of two parts, sliding into each other, one riveted to the tank and one to the underframe. This sectional area of dome yokes and tank bands must at no place be less than three-quarters of a square inch, or 1 inch round iron upset to 1⅛ inches at threaded end. Cars having no underframe, with tank securely riveted to body bolsters, do not require dome yokes or tank bands.

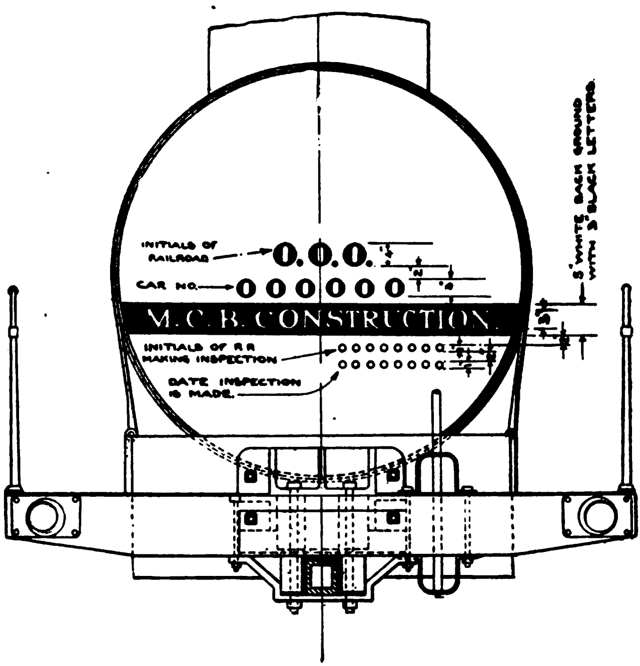
Explanation: A threaded end is 1⅛ inches in diameter or more, with a body consisting of a flat band 2 by ⅜ inches or equivalent section, or round iron 1 inch in diameter will be accepted as meeting the requirements.

The dome yoke proper which passes around the dome may be a rod ¾ inch in diameter, or its equivalent, to which is secured the strap or rod which is fastened to the underframe. The sectional area of dome yoke strap must be the same as required for tank straps.

Where tanks are equipped with a greater number of tank bands than called for, the total sectional area of all bands will be considered as meeting the requirements if they equal the total sectional area of the rods specified.

Existing tank cars, which have the required number of tank bands and dome yokes, but where the 1-inch rod fastening the tank band to the underframe is not upset for the threaded portion to 1⅛ inches, will be accepted until such time that the cars go to the shop for repairs, when the threaded portion of such bands must be changed to 1⅛ inches or 1⅛-inch rods used.

TEST. — Tanks must be carefully inspected and tested with cold water pressure at least once in ten years. The test for new tanks should be at sixty pounds per square inch and for old tanks at forty pounds per square inch, which they must stand without serious leak or evidence of distress. This inspection and test must be made by the tank-car owners, and all tanks must be so tested by January 1, 1908. Tanks, when tested, must be stenciled with date and place where test was made, and by whom, as follows:



Tested (Date)..
Pressure (Pounds per square inch)....................
At (Place) ....
By (Name of Firm)....................................

New Tanks. — New steel or iron tanks must be designed for a bursting pressure of not less than 240 pounds per square inch.

Inspection. — All tank cars at home on a railroad must be inspected by inspectors in the employ of that railroad company, and when such tank cars meet the requirements herein set forth, the legend shown below must be stenciled by the inspector on both tank heads, with the initials of the railroad company making such inspection and the date the inspection is made. If foreign tank cars and individual tank cars at home on foreign lines stenciled with the legend "M. C. B. Construction" by a foreign road are offered for movement over another railroad and some of the details do not conform to the requirements of the tank-car circular, a report of same should be made through the proper officers to the official in charge of equipment and the car allowed to proceed until further notice.

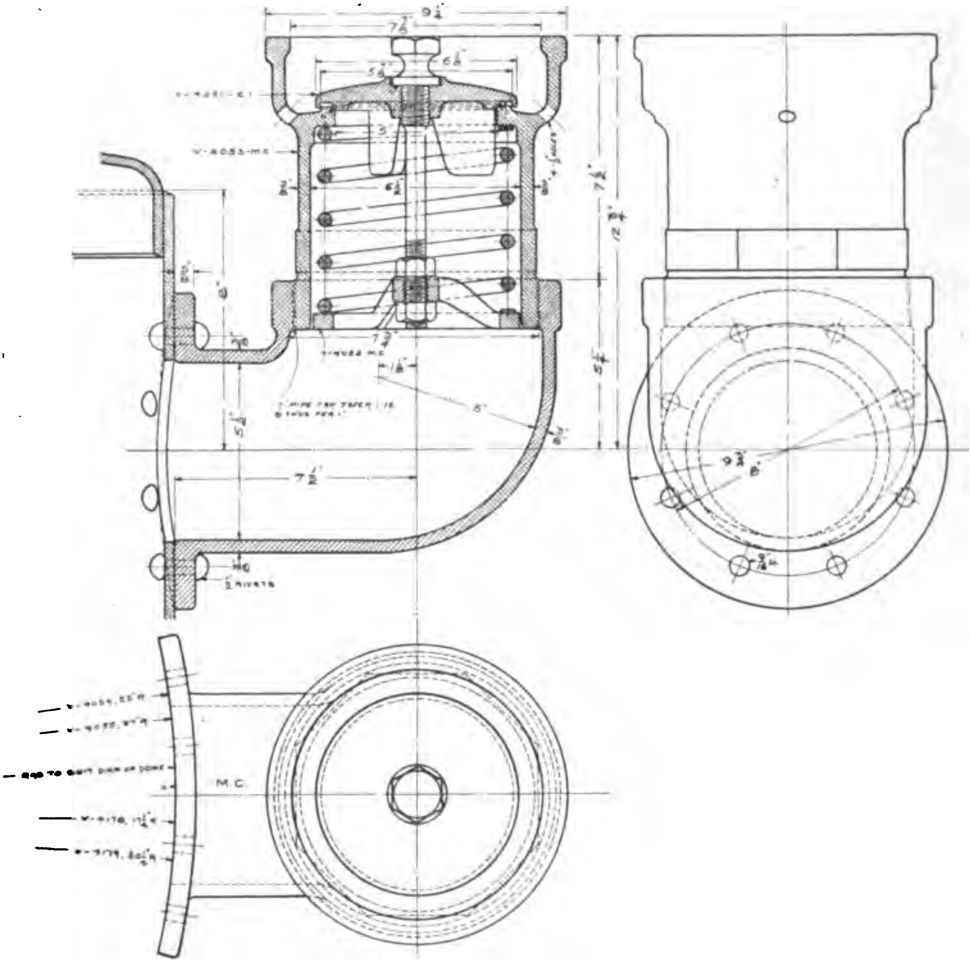
APPLICATION OF SAFETY VALVES.

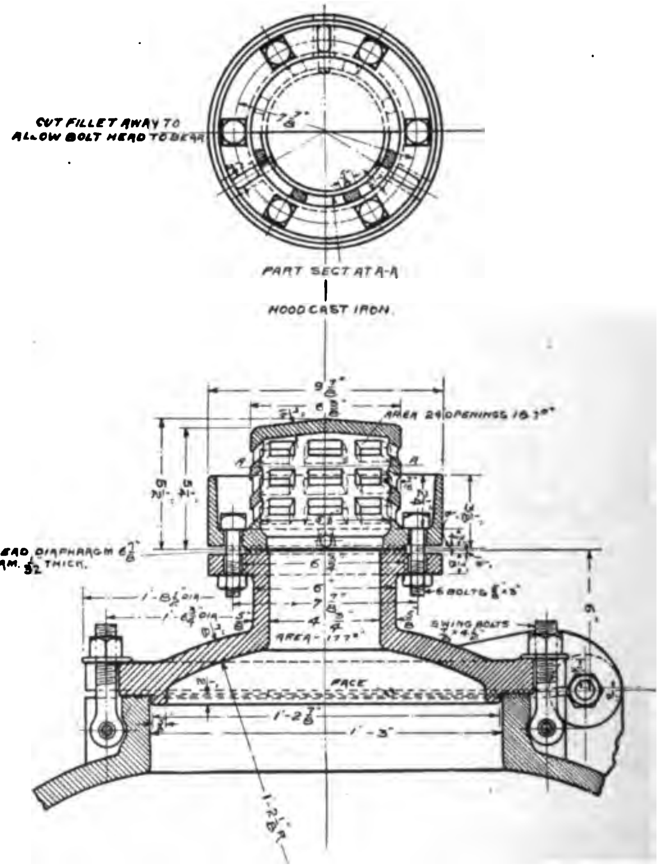
FIVE-INCH SAFETY VALVES. — All tanks carrying volatile or inflammable material, such as crude petroleum, fuel oil, benzine, naphtha, kerosene, illuminating oils, petroleum products, turpentine, etc., must be equipped with five-inch safety valves of the recommended design; one valve for a capacity of 6,500 gallons or less, and two valves for a capacity of more than 6,500 gallons. Where tank cars carrying such products are subdivided into compartments, each compartment must be provided with a safety valve. Where only one valve is used, it must be set to open at a pressure of eight pounds per square inch; where two valves are used, only one must be set to open at a pressure of eight pounds per square inch, and the other at twelve pounds per square inch.

SAFETY VENTS WITH LEAD DISKS.— Tank cars carrying volatile, non-inflammable products, such as gas liquor, ammonia liquor, etc., where the prevention of evaporation is essential, may be provided with vents depending on frangible lead disks for safety, which vents shall be of recommended design, as shown by cut below, the disks to be of a thickness that shall insure rupture at pressure not higher than twenty-five pounds per square inch.

VENT HOLE OR SMALL VALVE. — Tank cars carrying non-inflammable or non-volatile material, such as sulphuric acid, vinegar, linseed oil, cottonseed oil, lard oil, fish oil, tannery products, glucose, molasses, calcium chlorid, caustic soda, silicate of soda, etc., need not be provided with five-inch safety valves, but each tank must have a small open vent or valve, equal to not less than 2 inches in diameter.

In the case of such liquids as coal tar, containing volatile products where it is essential to avoid the escape of the vapor, either the frangible lead disk or standard safety valve may be used, otherwise one or more open vents equal in area to an opening of not less than two inches in diameter will be acceptable.


9¼"
7⅝"
5¾"
6⅛"
3"
V-4053-M.C.
6¼"
7¾"
V-4052 M.C.
1⅛"
PIPE TAP TAPER 1 IN 16
8 THDS PER 1"
8"
7½"
12¾"
7½"
5¼"
5½"
8"
⅞ RIVETS
9¾"
8"
M.C.
BAR TO SUIT DIAM OF DOME



OLD TANK CARS HAVING WOODEN UNDERFRAMES.

Tank cars having wooden underframes, of railroad or individual ownership, will be required to conform to the foregoing general specification, and in addition, must be as strong as the construction covered by the following detailed specifications:

Center Sills.— If cars are not equipped with intermediate sills, the underframes must have two center sills, each not less than 5 inches wide by 10 inches deep, or the equivalent in strength. If the car is equipped with intermediate sills, the center sills must not be less than 5 inches wide by 9 inches deep, or the equivalent in strength. Center sills must not be spaced more than 18 inches apart.

Center Sill Filling Timber.—Where draft timbers are underneath the center sills, the space between the center sills must be filled in with timbers not less in depth than center sills, extending from end sill to the center of nearest cross-bearer or cross-timber, provided the latter is located not less than 4 feet 6 inches from center of bolster. On cars where the draft arrangement is between center sills, the filler timber must be extended to the cross-tie timber when the cars go to shop for repairs to center sills. Center sills and filling timbers must be securely bolted together by means of ¾-inch bolts. On cars having center or intermediate sills not less than 10 inches wide by 10 inches deep, which may be made up of two 5 by 10-inch sills, bolted together, the filling timbers may be omitted.

END SILLS.— End sills not reinforced by buffer blocks must not be less than 9 inches wide by 10 inches deep. End sills 6 inches wide by 12 inches deep, reinforced with buffer blocks not less than 6 inches wide by 10 inches deep and of sufficient length to overlap center sills, will be acceptable as a substitute for 9 by 10-inch end sills.

On existing cars, if buffer blocks are used for the purpose of reinforcing end sills which do not come within the specified requirements, the buffer blocks in no case must be less than 4 inches thick nor end sill less than 6 inches thick. The total strength of the end sill and buffer block must be equal to the strength of the construction specified.

DRAFT TIMBERS.— Draft timbers secured to inside of center sills and extending to cross-bearer or cross-timber will be accepted as a substitute for filling timbers referred to above. Where center sills are 9 inches wide by 10 inches deep, or over, and draft timbers are placed between same, they need not extend farther back than body bolster, provided they are adequately secured to center sills by means of seven ⅞-inch bolts or their equivalent, and butt against body bolster. Draft timbers located underneath the center sills must not be less than 4 inches wide by 8 inches deep, and each draft timber must be held to center sills, end sills and buffer block by means of seven or more ⅞-inch bolts, or six 1-inch bolts. Where an arrangement for supporting draft timbers is substituted for one or more bolts and the construction is of equal strength, the same will be acceptable. Draft timbers extending beyond bolster must be secured to center sills by additional bolts.

DRAFT GEAR.— The draft gear and draft attachments must be at least as strong as the design shown in Fig. 1.

Cars should be provided with draft gear stops gained into draft timbers or heeled on end sills, filler timber or body bolster, and secured with five ¾-inch bolts; but cars having stops gained into draft timbers or heeled on end sill, filler timber or body bolster secured with three ¾-inch bolts may be continued in service until such time as they go to shop for repairs, when five bolt stops must be provided.

In all cases, tail yokes or attachments of equal strength must be used.

Tail bolts, tail straps or American continuous draft gear will not be accepted.

HEAD BLOCKS.—Head blocks must not be less than 10 inches wide unless reinforced by metal plates, and of sufficient depth to extend at least 6 inches above bottom of tank, and may be made of two pieces bolted together and bolted to underframe by means of not less than four ⅞-inch vertical bolts. They must be cut out to suit curve of tank. The ends of each head block should, preferably, be tied to corresponding end of head block at the other end of the car by means of rods not less than 1 inch in diameter, with 1⅛-inch threaded ends, and each head block supported at center by means of a substantial casting securely bolted to end and center sills. Where the construction of the car does not permit of this fastening, the following may be substituted:

The ends of each head block tied to corresponding end of head block at the other end of car by rods not less than 1 inch in diameter, with 1⅛-inch threaded ends, and each head block secured by two stay rods 1 inch in diameter anchored to center sills;

Or, head block supported at center by means of a substantial casting securely bolted to end and center sills and two 1-inch rods passing diagonally through head block toward bolster and secured to underframe;

Or, head block secured by two stay rods 1⅛ inches in diameter anchored to center sills;

Or, head block secured by two stay rods 1 inch in diameter anchored to center sills and two 1-inch rods passing diagonally through head block toward bolster and secured to underframe;

Or, head block secured by two stay rods 1 inch in diameter anchored to center sills and two straps not less than ¾ inch thick and 3 inches wide passing over head blocks and securely fastened to underframe.

DOME HEADS AND COVERS.—Where tank cars are fitted with cast-iron dome heads and covers not sufficiently strong to stand the necessary 40 pounds hydraulic test, they must be replaced by others of cast or pressed steel, or of malleable iron.

TANK HEADS.—Tank heads less than 7-16 of an inch thick bearing evidence of damage from impact with head blocks, should be reinforced at bottom by means of steel plate shoes ⅜ inch thick, riveted to head and shell.

NEW TANK CARS.

No tank cars built hereafter shall be accepted for transportation unless equipped with steel underframing or with reinforced shell. The design and construction of the car throughout must be at least as strong as that shown in attached Figs. 2 and 3.

New tank cars must conform to the general specifications given in the foregoing in addition to the following detailed specifications:

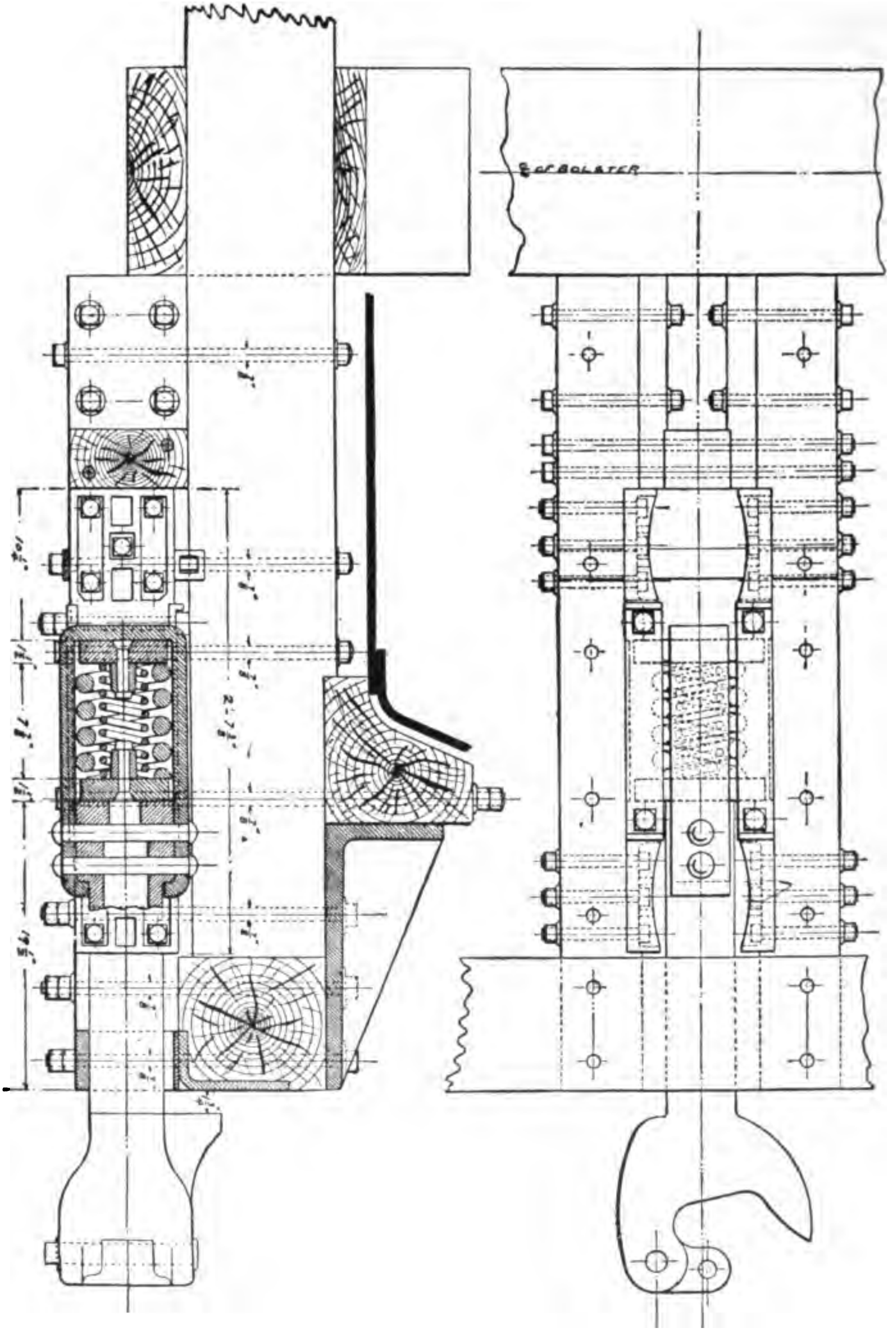


Fig. 1. Minimum Requirements for Tank Cars with Wooden Underframe.

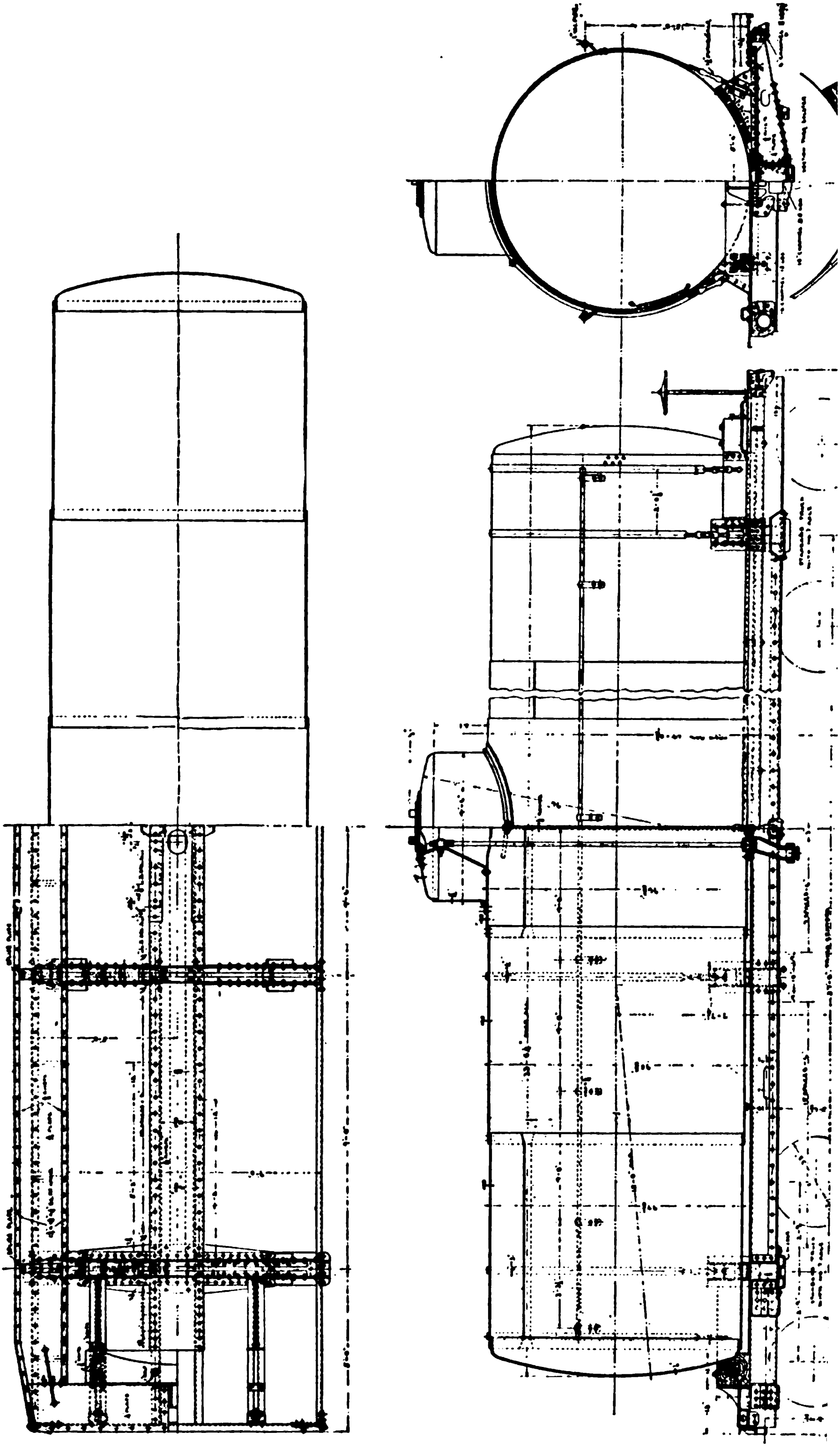
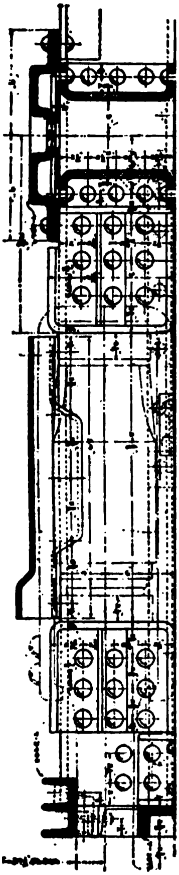


Fig. 2.



Center Sills.—The center sill construction of the underframe between bolsters, must have a sectional area of at least thirty square inches.

Bolsters; Draft Gear.— Each car must be equipped with steel body and truck bolsters, steel couplers and a draft gear of approved design, having a capacity of at least 60,000 pounds. Tail bolts or straps must not be used.

Tank Seams.—All longitudinal and head seams must be double riveted. Where head blocks are not used, head seams need not be double riveted.

Cars Without Underframes.— If the car has no underframe, the tank shell at bottom must be at least ⅝ inch thick, and all circumferential seams in bottom sheet except head seams must be double riveted. The sectional area of the additional metal in bottom of tank shell must be at least 20 square inches.

Longitudinal Anchorage.— Particular attention must be given to the longitudinal anchorage of the tank, which must be thoroughly substantial, to prevent end shifting.

Steel underframe tank cars must have a longitudinal clearance for tank valve extension of not less than 2½ inches on each side of valve.

Wooden underframe tank cars must have as much longitudinal clearance for tank valve extension as the construction will permit, with a minimum of six inches on each side.

Dome Heads and Covers.— Dome heads and covers must be made of either cast or pressed steel or of malleable iron.

AIR BRAKE AND TRAIN AIR SIGNAL INSTRUCTIONS.

In 1898 the Air Brake and Signal Instructions which had been in use since 1892 were slightly revised and adopted as a Recommended Practice of the Association. Revised in 1904. These instructions were also approved by the American Railway Master Mechanics' Association as originally adopted in 1892 and as revised in 1898 and 1904. For instructions in detail, see separate pamphlet.

AIR-BRAKE APPLIANCES.

Sheet M. C. B. — G.

In 1899 a Recommended Practice for the location of air brake parts on different classes of cars was adopted, as follows:

1. Location of air-brake cylinders and triple valves on box cars and other clear bottom cars.

2. Location of air-brake cylinders and triple valves on hopper gondola cars and drop bottom gondola cars.

3. Arrangement of piping for clear bottom cars, or cars of the box car type.

4. Location of main air pipe at ends of cars.

5. As to the manner of fastening air cylinder reservoirs, retaining valves, etc., to the framework of cars, the bolts fastening the cylinders and reservoirs should be either double-nutted or cottered, so as to prevent the same from working loose. The air pipes should be fastened to the framework of the car with a liberal number of clamps.

One elbow should be applied to the retaining valve pipe, it being located at the end sill of the car where pipe turns upward.

One union should be applied as close to the triple valve as practicable to permit the easy removal of same; the pipe to be carried along under side of the intermediate sill when practicable, from the triple valve to end of car, and be supported by either staples or clamps, not to exceed six feet apart.

6. Badge for marking air-brake hose to show dates of application and removal, manufacturer's name and name of railroad company. See Sheet M. C. B. 9.

In 1904 the location of main air pipe and angle cock shown on Sheet G was changed to Standard, and is now shown on Sheet M. C. B. 9.

AIR-BRAKE TESTS.

In 1895 a code for the guidance of the Committee on Air-Brake Tests in testing triple valves was adopted as Recommended Practice for such tests, which code is as follows:

CONDITIONS OF TESTS.

No. 1.—Construction of Rack.—Brakes will be tested on a rack representing the piping of a fifty 34-foot car train. All cocks, angles and connections will be as nearly as possible identical with those in train service. The rack shall conform to a blue-print which is in the hands of the committee, which gives the proper fitting, piping, dimensions of cylinder, auxiliary reservoirs, main reservoirs, engineer's valve, etc.

No. 2.—Pressure.—Tests will be made with a uniform train-pipe pressure of 70 pounds.

No. 3.—Construction of Triples.—Triples must be constructed so that they can be secured and operated on apparatus conforming to diagrams, Figs. 1 and 2 (see pages 166 and 167 of the 1892 Annual Report).

No. 4.—To secure accuracy in measurement of time application and release tests, electrical recording apparatus will be used, arranged to give an indicator card in the fiftieth car.

No. 5.—Tests shall be repeated three times under the same general conditions. The temperature at the time of the test will be recorded.

No. 6.—Classification.—Triples shall be classified Nos. 1, 2, 3 and outlawed. In grading triples the reasons for their classification shall be given.

No. 7.— The three essentials for a quick-action brake are as follows:

First. Graduation.
Second. Release.
Third. Quick action.

RACK TESTS.

No. 1. — APPLICATION TEST (*a*) (SERVICE). — Brakes must show with full service application and 6 inches piston travel, a brake cylinder pressure of 50 pounds. The minimum pressure must not be less than 48 pounds, nor the maximum pressure over 52 pounds. This test will be made with:

(1) 4 inches piston travel.
(2) 6 inches piston travel.
(3) 12 inches piston travel.

The necessity for the 4-inch and 12-inch piston travel tests will depend upon the character of the brakes being tested.

NOTE.— The object of this test is to secure such proportion between the auxiliary reservoir and the brake cylinder as will give the desired maximum power in a full service application of the brake.

No. 2. — APPLICATION TEST (*b*) (EMERGENCY). — Brakes must be applied on the fiftieth car with at least 45 pounds pressure with 6 inches piston travel in three seconds from the first movement of the engineer's handle. They should indicate at least 55 pounds in three and one-half (3½) seconds. The final maximum pressure in this test must not be less than 15 per cent, nor more than 20 per cent above the pressure given by the same brake in full service application.

This test will be made to determine that quick action is obtained in each case, with

(1) 4 inches piston travel.
(2) 6 inches piston travel.
(3) 12 inches piston travel.

NOTE.— The object of this test is to secure, as nearly as possible, uniformity of pressures in the brake cylinders in an emergency application, and as nearly as possible a uniformity of time required to attain the pressures; to secure a minimum length of stop, of shock and of trains parting.

No. 3. — APPLICATION TEST. (*c*). — Commencing with the first car from the engine, the brakes of three successive cars, or less, if they fail to jump three, will be cut out until the fifth, sixth and seventh are cut out, the brakes in each case to be applied as per Test No. 2. After the first series of three has been tested, in order to test the second series the first car must be cut in, and so on. The quick-action brake should pass the three cars cut out and apply on the fiftieth car in the same time as in Test No. 2. Tests will be made with piston travel of 4 inches.

In addition, at least two other applications shall be made with three successive triples cut out in any portion of the rack beyond the fifth car.

Note.— In freight-car service the most common method of remedying a defective brake is to cut the brake out; hence it is essential that a limited number of brakes can be cut out successfully without destroying the quick-action feature.

No. 4.— Graduating Test (*a*).— Seventy pounds train-pipe pressure having been secured, the following tests will be made:

(1) A reduction of 8 pounds in train-pipe pressure. This should apply lightly the fifty brakes.

(2) A further reduction of 4 to 6 pounds. This should increase the braking power on all the brakes.

(3) A reduction of 30 pounds should equalize the pressure between the auxiliary reservoirs and brake cylinders. The piston travel in this test will be six inches.

(*b*).— One or more triples shall also be tested, having substituted for the brake cylinder a reservoir having the capacity of a cylinder with 8-inch stroke. The first admission to the cylinder should be made with a reduction of train-pipe pressure not exceeding five pounds, each succeeding reduction should reduce the pressure in the auxiliary reservoir not to exceed three pounds, until full equalization takes place. The pressure in the train pipe should not be more than three pounds lower than the equalized pressure in the brake cylinder and reservoir at full equalization.

No. 5.— Test to Determine the Sensitiveness of the Service Valve.— Three valves selected at random will be taken for this test and each tried separately. They will be tested on a train-pipe representing a locomotive and one car, the engine and tender brake being cut out.

A train-pipe pressure of 70 pounds having been secured, the air will be discharged as rapidly as it may through an opening in the engineer's valve of two sixty-fourths to three sixty-fourths (2 to 3-64) inch diameter. Under this condition the service action must take place and continue to take place without any appearance of quick action (P E, Partial Emergency) until the disk has been enlarged up to and including a 10-64 opening.

Note.— The object of this test is to insure the working of triples in "service" with practically the same reduction of air.

No. 6.— Test to Determine the Sensitiveness of the Quick-Action Valve.— The same three valves as in No. 5, or others selected at random, will be taken for this test and each tried separately. They will be tested under the same train-pipe conditions as Test No. 5. Engine and tender brake cut out.

A train-pipe pressure of 70 pounds having been secured, the air will be discharged as rapidly as it may through disk openings, as in the preceding test, increasing in diameter by 1-64. Triples must not show a range of more than 3-64 before full quick action is reached. Full quick action must not take place before 11-64, but must take place when the opening is 14-64.

Note.— The object of this test is to check the introduction of triples which will cause quick-action application when not wanted.

No. 7. — TEST TO DETERMINE THE HOLDING POWER OF THE BRAKE IN SERVICE APPLICATION AND QUICK-ACTION APPLICATION.

(*a*) SERVICE APPLICATION. — Gauges will be placed on the cylinder and auxiliary reservoir of the first, twenty-fifth and fiftieth cars with 70 pounds train-pipe pressure; brakes will be applied by admitting, as nearly as may be, 15 pounds into the cylinder of the first car. Record of pressure in the auxiliary reservoirs and cylinders will be taken as follows:

(1) At the first application.
(2) In five minutes from first application.
(3) In ten minutes from first application.
(4) In fifteen minutes from first application.

(*b*) QUICK-ACTION APPLICATION.— This will be the same as above, except that all the air will be exhausted from the train pipe.

(*c*) DUMMY CYLINDER TEST.— A modification of the holding test, as with the graduating test by the introduction of dummy cylinders.

No. 8. — RELEASE TEST. — The following conditions should be observed in this test:

(*a*) Main air reservoir cut in.

(*b*) Any pump or boiler pressure may be used that will maintain a uniform head of 90 pounds pressure.

A uniform pressure of 70 pounds having been secured in the train pipe, all the air will be exhausted by a quick-action application. A pressure of 90 pounds will then be maintained against a diaphragm perforated by a 3-32 hole, and a record taken of all brakes that release inside thirty minutes. In making this test special care must be taken to see that there is no leak in the train pipe.

It will not be considered satisfactory if a greater proportion than ten per cent fail to release in the prescribed time.

Note.— This test, in addition to testing the release feature of the triples, is intended as an equivalent to a release after a break-in-two in train service.

No. 9. — TEST TO DETERMINE THE TIME OF CHARGING ONE AUXILIARY RESERVOIR:

(*a*) Cut out the brake to be tested by the cut-out cock.

(*b*) Bleed the auxiliary reservoir empty and close the bleed cock.

(*c*) Keep the pump running and maintain a head of 90 pounds in main air reservoir and train pipe during test.

(*e*) Cut in the brake to be tested and note from the reading of the gauge the time occupied in charging to 70 pounds. The time of charging should be 55 seconds. The reservoir should not be charged in less than 45 seconds nor more than 60 seconds.

NOTE.— The object of this test is to prevent irregular charging of auxiliary reservoirs and thus insure that the front brakes will not apply after charging.

No. 10. — TEST TO DETERMINE WHETHER QUICK ACTION WILL FOLLOW A SERVICE APPLICATION.

Commencing with a service application of 20 pounds pressure in the first cylinder a full quick-action reduction will follow. It will be observed whether quick action takes place or not. The pressure in the first cylinder will be increased or decreased by steps of about 5 pounds until the point at which quick action ceases or commences is determined. Quick action should take place with not less than 20 pounds in the first cylinder.

NOTE.— The object of this test is to determine whether, after a service application, quick action can be obtained without first releasing the brakes.

No. 11. — Such additional tests as in the judgment of the committee the construction of the triples submitted to them for test warrants.

TRAIN TESTS.

No. 1. — In order to provide against defects which a rack test may not develop, it is recommended that railroads make a 50-car train test in actual service before accepting the result from the rack test as final.

No. 2. — In making application test No. 2 with a train, the measurement of time from the first car to the fiftieth car should be provided for. This will determine the time occupied by the engine brake as against the car brake.

No. 3. — Special care should be taken with the engine and tank brakes in order that they may do their share of the braking during the stops, and not pull away from the train.

No. 4. — All brake shoes must have a proper bearing on wheels, which is best accomplished by giving them some previous service before testing, and all should be of the same material.

No. 5. — Tests to determine the shock should be made on a level track, with all the slack in the train pulled out at the time the brakes are applied.

CLEANING AIR BRAKES.

In 1902 the following method for cleaning air brakes was adopted as the Recommended Practice of the Association:

INSPECTION AND CLEANING OF TRIPLE VALVES.

The triple valve should be removed from the car for cleaning in the shop, and should be replaced by a triple in good condition. It should be dismantled, and all the internal parts, except those with rubber seats and gaskets, immersed in kerosene oil to soften the accumulated oil and gum.

No hard metal should be used to remove gum or dirt, or to loosen the piston-packing ring in its groove, as the almost inevitable result will be damage to some vital part of the triple. Particular pains should be taken in cleaning the feed groove not to enlarge it. Rags, or better still, chamois skins should be used rather than waste, as the latter invariably leaves lint on the parts on which it is used. Great care must be used in removing the emergency valve seat, as this is frequently found bruised and distorted in triples which have been cleaned. The working parts should be carefully examined to know that they are in good order. Particular attention should be given the triple piston-packing ring. It should have a neat fit in its groove in the piston, and also in the triple-piston bushing. The fit of the packing ring in its groove and bushing and the condition of the bushing should be such as to pass the prescribed tests. The graduating stem should work freely in its nut, and the graduating spring be of standard dimensions and free from corrosion. The slide valve, triple piston-packing ring and bushing should be lubricated with a few drops of light-bodied, high-grade mineral lubricating oil, such as dynamo oil; but the emergency piston, valve and check should not be oiled.

Should the triple piston-packing ring need to be renewed, or the bushing require truing, we strongly recommend that such work be done by the manufacturers. We are thoroughly convinced that the average workman can not, or, at least, does not do work of this kind satisfactorily, and that by far the largest proportion of the attempts to economize in this way results in inefficient air brakes and slid-flat wheels. It also permits a departure from the maintenance of standards in the several parts, which can not but result in demoralization in repairs.

Usually, sufficient attention is not paid to the condition of the emergency parts of the triple, as shown by their condition. The emergency-valve seat is found damaged, the stem bent, the rubber seat imperfect and the check valve not properly fitting in a number of cases. These facts account for a large number of slid-flat wheels.

The cylinder-cap gasket and check-valve case gasket should be carefully examined and cleaned by using a cloth. They should not be scraped with a metal tool. Judging by an examination of a number of triples, these gaskets should be renewed more frequently than they are.

Before assembling the parts after cleaning, the casings and body of the triple should be thoroughly cleaned out with a blast of compressed air. In taking down and replacing the emergency parts of the triple, the greatest care should be exercised not to injure any of them. More damage is done by careless workmen in taking down these parts than is done in replacing them.

When replacing the triple valve on the auxiliary reservoir, the gasket should be fitted to the triple instead of the reservoir. Home-made gaskets should be avoided, and standard gaskets of the manufacturer be used. Reports have been made where triple pistons have been found bent, due to the use of gaskets of irregular thickness, and trouble has been experienced in using gaskets which are too thick or too thin.

CLEANING AND INSPECTION OF THE BRAKE CYLINDER.

The brake cylinder need not be removed from the car for cleaning. First secure the piston rod firmly to the cylinder head, then, after removing the cylinder head, piston rod, piston head and release spring, scrape off all deposits of gum and dirt with a narrow putty knife or its equivalent, and have the removed parts wiped with waste saturated with kerosene or other light oil. The packing leather should never be permitted to soak in kerosene oil, as the penetrating qualities of kerosene reach into the pores of the leather, and force out the life-giving qualities of the special oil in which the leather is treated by the manufacturer. Particular attention should be paid to cleaning the leakage groove and the brake-cylinder tube. The packing leather and expander ring should receive their share of proper inspection and cleaning. The expander ring should be of a circumference which shall fit the bore of the brake cylinder when the ring is removed from its place between the follower and packing leather and entered in the cylinder. In all cases the follower nuts should be drawn up snugly before replacing the piston, and the inside of the cylinder and the packing leather evenly coated with a suitable grease or vaseline. A goodly quantity of grease should be placed on the expander ring and the adjacent side of the packing leather, thus permitting the pressure to force the grease into the leather and giving it greater life.

No sharp tool should be used in getting the packing leather into the cylinder. After the piston is in place and before the cylinder head is fastened on, the piston rod should be slightly rotated in all directions about three inches from the center line of the cylinder, in order to be certain that the expanding ring is not out of place. The old stencil marks should be removed. The auxiliary reservoir should be stenciled on both sides, with the date and place of cleaning, using white lead for the purpose; and if the car belongs to a foreign road, a repair card should be attached, as provided by the rules. The bolts or nuts holding the cylinder and reservoir to the car should be tightened.

TESTING TRIPLES.

After cleaning and repairing, it is essential that triples be tested and come within required limits, if a reasonable efficiency of the air brakes is to be maintained.

Test No. 1.— The tightness of the slide valve, the emergency and check valves and all joints should be determined by painting with soapsuds.

Test No. 2.— Maintaining a pressure of ninety pounds in the train pipe, the auxiliary reservoir should reach seventy pounds in not less than forty-five seconds or more than sixty seconds, as provided for in Test No. 9 of the M. C. B. Air-brake Tests Code.

Test No. 3.—To test repaired triples for release, charge the auxiliary to seventy pounds pressure and make a full service reduction of twenty pounds, or until the auxiliary and cylinder pressure are equal. Place the special cut-out cock in such position that pressure must pass through the 3-64-inch port, and turn main reservoir pressure of ninety pounds into the train pipe. If the triple does not release under these conditions, it should be condemned.

Test No. 4.—The triple piston-packing ring should be tested for leakage by blocking the piston in the graduating position, preferably by use of the device shown at "A" in the accompanying diagram, maintaining the train-pipe pressure at seventy pounds. Under these conditions the pressure in the auxiliary reservoir should not increase faster than fifteen pounds per minute.

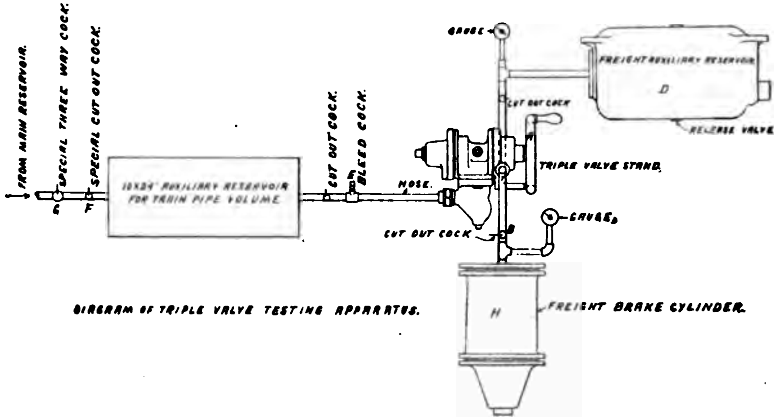


DIAGRAM OF TRIPLE VALVE TESTING APPARATUS.

STEAM AND AIR LINE CONNECTIONS.

Sheet M. C. B.—E.

In 1903 the following specifications for steam and air line connections were adopted as Recommended Practice:

Two-inch steam train pipe; end train-pipe valves; steam hose, 1⅝-inch inside diameter and of such length as to provide 31 inches from face of coupling gasket to end of hose nipple; 1½-inch steam hose couplings of dimensions to agree with those shown on Plate F, with gaskets having 1½-inch diameter opening, gaskets to be so constructed that the normal diameter of opening will always be maintained; couplings not provided with gravity traps; inlet valves to have reduced openings which should be as small as possible and maintain the volume of steam required by the radiating pipes for the severest weather conditions.

(15.) That the steam heat, air-brake and air-signal connections be located as shown on Plate *E* herewith.

(16.) That the air-brake and air-signal hose should be 1 inch in diameter and 22 inches long.

BRAKE BEAMS.

In 1907 the following details regarding brake beams were adopted as recommended practice:

That brake hangers shall have an angle as nearly as possible to 90 degrees from a line drawn from the center of the brake shoe to the center of the axle when the shoes are half worn.

That brake-beam hanger brackets shall be attached to some rigid portion of the truck.

That the opening between the gibs of the yoke for the 9⅛-inch butt-coupler be made 6¾ inches instead of 7¾ inches, in order to increase the bearing of the present yoke on the coupler butt.

CARRIER IRON.

In 1908 a Recommended Practice was adopted to use a U-shaped carrier iron for brake shaft bow for new cars, so that the half-yoke now largely used would not be extended to new cars.

HIGH SPEED FOUNDATION BRAKE GEAR FOR PASSENGER SERVICE.

Sheets M. C. B.—J, K & L.

In 1903 the schedules for high speed foundation brake gear, as shown on Sheets M. C. B.—J, K & L, were adopted as Recommended Practice. Fig. B. C. 7—A was modified in 1907. In preparing these schudules the following fundamentals of design were adopted:

FUNDAMENTALS.

Following are the fundamentals of the design:

Braking power to be 90 per cent of the light weight of the car.

Equalized pressure in brake cylinder, sixty pounds per square inch.

Maximum pressure in brake cylinder, eighty-five pounds per square inch.

Maximum stress in levers, 23,000 pounds per square inch.

Maximum stress in rods, except jaws, fifteen thousand pounds per square inch; no rod to be less than ⅞ inch in diameter.

Maximum stress in jaws, ten thousand pounds per square inch.

Maximum shear on pins, ten thousand pounds per square inch.

Diameter of pins to provide a bearing value not to exceed 23,000 pounds per square inch.

The reduction of stresses in rods, levers and jaws due to friction of the foundation brake, and the reduction of braking power due to the same cause and to the action of release springs should be neglected, because it is considered to be too difficult to determine their value even with a fair degree of accuracy.

SIX-WHEEL TRUCKS.

The committee submits Plate K, schedule "A-1," herewith for cars weighing 80,000 to 100,000 pounds and having six-wheel trucks, and schedule "A" for cars weighing 100,000 to 137,000 pounds and having six-wheel trucks; the difference between these schedules is that a sixteen-inch brake cylinder is to be used for schedule "A" and a fourteen-inch brake cylinder is to be used for schedule "A-1," otherwise they are the same. The location of the fulcrum hole in the cylinder lever is made to vary by quarters of the inch to suit the weight of the cars, but only one fulcrum hole shall be drilled in each lever.

With schedule "A" there should be used a brake suitable for a load of 28,000 pounds, and with schedule "A-1" there should be used a brake beam suitable for a load of 22,000 pounds imposed at the middle of the beam.

FOUR-WHEEL TRUCKS.

Plate L, schedule "B-1," submitted herewith, is for cars weighing 50,000 to 70,000 pounds and having four-wheel trucks, and schedule "B" is for cars weighing from 70,000 to 90,000 pounds and having four-wheel trucks, the differences between the two being that a fourteen-inch brake cylinder is to be used with schedule "B," cars weighing 70,000 to 90,000 pounds, and a twelve-inch brake cylinder is to be used with schedule "B-1," cars weighing 50,000 to 70,000 pounds; also that with schedule "B" there should be used a brake beam suitable for a load at the middle of 28,000 pounds, the same as for schedule "A," and with schedule "B-1" there should be used a brake beam suitable for a load at the middle of 22,000 pounds, the same as for schedule "A-1."

The proper braking power for the weight of car is obtained by the location of fulcrum hole in the cylinder lever.

Plate M, schedule "C," was designed for cars weighing 50,000 pounds and less and equipped with four-wheel trucks. A ten-inch brake cylinder is to be used with this schedule and a brake beam suitable for a load at the middle of 15,200 pounds.

DESIGNATION OF RODS AND LEVERS.

On the drawings, the location of levers and rods are designated by letters, the first letter in the designation distinguishes between body and truck. The second letter distinguishes between the levers and the connections. The figure following the second letter is the distinctive number for the lever or connection; and following this figure is the schedule letter to which the lever or connection belongs. Thus B-C2-B means body connection number two (second from cylinder piston rod), of schedule "B"; also T-L2-B would mean truck lever number two for schedule "B."

STENCILING LIGHT WEIGHT OF CAR.

(21.) The committee recommends that the light weight of car be stenciled on each car. The cross frame tie, when exposed, furnishes a convenient place on which to show the weight, but when this place is not available some other means should be provided. In addition to this the length of the cylinder end of the cylinder lever should be shown so that no calculation would be necessary to determine the proper cylinder lever for the car.

MARKING LEVERS.

It may be found desirable by some railroad companies to mark each lever in a manner to indicate the schedule to which each belongs and the location of each in the brake rigging, and if this is done it is suggested that the marking be the same as indicated on the drawings.

TABLE I.

Schedule Designation.	Light Weights of Cars. (Lbs.)	Type of Truck.	Size of Brake Cylinder.	Maximum Load at Middle of Brake Beam.
A.	100,000 to 137,000	6-wheel	16 inches	28,000 lbs.
A-1.	80,000 to 100,000	6-wheel	14 inches	22,000 lbs.
B.	70,000 to 90,000	4-wheel	14 inches	28,000 lbs.
B-1.	50,000 to 70,000	4-wheel	12 inches	22,000 lbs.
C.	50,000 and less.	4-wheel	10 inches	15,200 lbs.

There have been brought together in Table I the distinctive data of each schedule so that by referring to the table there can be found quickly the correct schedule for any particular car.

SIGNAL LAMP BRACKETS AND SOCKETS.

Sheet M. C. B.—E.

In 1903 a form of combination lamp holder and flag bracket was adopted as Recommended Practice. It is shown on Sheet M. C. B.—E.

UNCOUPLING ARRANGEMENTS FOR M. C. B. COUPLERS.

Sheet M. C. B. — B.

In 1897 designs showing the details of uncoupling arrangements to concealed end sill cars and outside end sill cars were adopted as Recommended Practice.

In 1905 the shoulder of the bracket for the uncoupling rod was made bevel.

In 1908 these details were revised and changes made to overcome former defects.

The special feature of this uncoupling attachment is the slotted center bracket. By placing the rod back on top of end sill or head block a longer arm is obtained, which gives sufficient lift with ample slack in the chain, and by using a sloping slotted bracket the rod projects 1½ inches in front of coupler lock, which is about the best position for an efficient lift. The slotted bracket allows the rod to slide back 3½ inches and avoids interference when slack of train is bunched.

The handle shown should preferably project below end of car or be bent as shown by dotted lines on Sheet M. C. B.— B, in order to protect the operator's hand.

Three links 3¾ inches, 5¾ inches and 7¾ inches long, respectively, are shown. By using one of these three links, therefore, a chain 6½, 8½ or 10½ inches long is obtained, which should fit all cars and M. C. B. couplers. These links should avoid the use of split links, " S " hooks and other temporary repair devices now very common. The arrangement as a whole is applicable to all types of cars, and if properly applied will largely obviate present troubles. Only a few limiting dimensions are shown on the drawing, as the others must be adapted to each particular class of car; but the dimensions for center arm, chain slack and position of lift pin eye should be carefully adhered to.

TWIST GAUGE FOR NEW COUPLERS.

Sheet M. C. B. — G.

In 1899 a twist gauge for new couplers, as shown in Sheet M. C. B. — G, to be used so as to insure that the heads are neither twisted nor displaced sidewise with relation to shank, was adopted as Recommended Practice.

KNUCKLES.

In 1905, as a result of letter ballot, the following Recommended Practice was adopted:

That the use of a knuckle-throwing device, which will throw the knuckle completely open and operate under all conditions of wear and service is favored by this Association.

MOUNTING WHEELS.

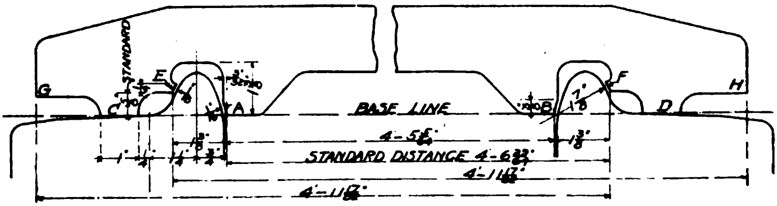
In 1897 the Recommended Practice for mounting wheels was modified by letter ballot by the omission of that part providing, among other things, that wheels with flanges worn to a thickness of 1⅛ inches or less should not be remounted, and the substitution therefor of the following:

First. — That wheels with flanges worn to a thickness of 1 1-16 inches or less shall not be remounted.

Second. — That the thickness of flanges of wheels fitted on the same axle should be equal and should never vary more than 1-16 inch.

Third. — That in mounting wheels, new or secondhand, the standard wheel check gauge should be used in the following manner:

After one wheel is pressed into position, place the stop "A" or "B" of the check gauge against the inside of the flange of the wheel with the thinner flange with the corresponding tread stop "C" or "D" against the tread of the wheel. Press the other wheel on the axle until the opposite tread stop comes in contact with the tread with the corresponding gauge point "E" or "F" in contact with the outside of the thicker flange.



WHEEL CHECK GAUGE

LIMIT GAUGES FOR INSPECTING SECONDHAND WHEELS FOR REMOUNTING.

Sheet M. C. B. — J.

In 1907 limit gauges for use at shops when inspecting secondhand wheels for remounting were adopted as Recommended Practice. They are shown on Sheet M. C. B. — J.

MINIMUM THICKNESS FOR STEEL TIRES.

Sheet M. C. B. — A.

In 1894 a Recommended Practice was adopted for Minimum Thickness for Steel Tires of Car Wheels, to be 1 inch, to be measured normal to the tread and radial to the curved portions of the flange through the thinnest part within 4¼ inches from the back of the flange; the thickness from the latter point to the outer edge of tread to be not less than ½ inch at thinnest part as shown on Sheet M. C. B. — A.

A further practice was adopted of cutting a small groove, as shown in the outer face of all tires when wheels are new, at a radius ¼ inch less than that of the tread of tire when worn to the prescribed limit, to facilitate inspection.

LIMIT GAUGES FOR ROUND IRON.

In 1893 limit gauges and diameters for round iron were adopted as a Recommended Practice; these had formerly been Standard of the Association. See Proceedings 1883, pages 37 and 38, 116-118; Proceedings 1893.

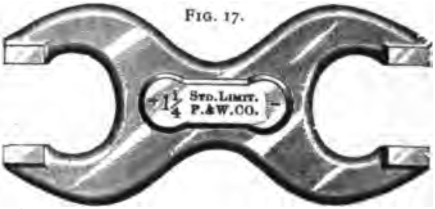


Fig. 17.
+1¼
Std. Limit.
P.&W.Co.
–

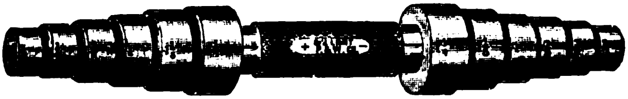


Fig. 18.

Limit gauges such as shown herewith for 1¼-inch iron are recommended for use in procuring round iron to take the Sellers' standard screw threads; round iron used to be of such size as will enter the large or + end of the gauge intended for that size, in any way, and also of such size as will not enter the small or — end in any way.

The limiting diameters for certain nominal sizes of iron, together with the maximum variation allowable by such use of these gauges, are given in the following table:

SIZES OF LIMIT GAUGES FOR ROUND IRON.

Nominal Diameter of Iron.—Inches.	Large Size, + end. Inches.	Small Size, — end. Inches.	Total Variation Inches.
¼	.2550	.2450	.010
5/16	.3180	.3070	.011
⅜	.3810	.3690	.012
7/16	.4440	.4310	.013
½	.5070	.4930	.014
9/16	.5700	.5550	.015
⅝	.6330	.6170	.016
¾	.7585	.7415	.017
⅞	.8840	.8660	.018
1	1.0095	.9905	.019
1⅛	1.1350	1.1150	.020
1¼	1.2605	1.2395	.021
1⅜	1.3860	1.3640	.022
1½	1.5110	1.4890	.022
1⅝	1.6140	1.636	.022

CHECK CHAINS.

In 1893 the use of truck and car body check chains, properly applied, was adopted as a Recommended Practice. See Proceedings 1874, pages 27 and 72; Proceedings 1893. In 1896 it was agreed that this recommendation referred to passenger equipment cars only.

PLATFORM SAFETY CHAINS.

In 1893 a Recommended Practice was adopted for location and details of platform safety chains for passenger equipment cars. See Proceedings 1890 and 1893. In 1896 this was modified as follows: Platform Safety Chains for passenger equipment cars to be located 14½ inches each side of center; to be suitably attached to under side of platform timbers, and to be of such length that when extended horizontally the chain with hook shall measure 12¾ inches from face of end timber to bearing point of hook, and the chain with eye shall measure 2¾ inches from face of end timber to bearing point of eye. The hook shall not be more than 1¼ inches thick transversely, and the eye shall not be less than 1½ inches wide, or less than 4 inches long in its opening. When facing end of car the chain fitted with hook shall be on the left-hand side, and the chain fitted with eye on the right-hand side. See Proceedings 1896.

SAFETY CHAINS FOR FREIGHT CARS.

Sheet M. C. B. — A.

In 1894 a Recommended Practice was adopted for Safety Chains for Freight Cars, when such chains are used. The use of safety chains on freight cars was not recommended, but when they are used on cars for special service a location is recommended as shown.

In 1904 a Recommended Practice for safety chains for Steel Freight Cars was adopted. See letter ballot, Proceedings 1904; also Sheet M. C. B. — A.

SAFETY CHAINS.

Sheet M. C. B.— B.

In 1905, as a result of letter ballot, the two designs of temporary safety chains for chaining together cars carrying double loads, shown on Sheet M. C. B.— B, were adopted as a Recommended Practice.

PERMANENT STAKE POCKETS.

In 1905, as a result of letter ballot, the following Recommended Practice was adopted regarding Permanent Stake Pockets:

1. That the method of securing permanent stake pockets to cars of wooden construction be by U bolts.

2. That the method of securing permanent stake pockets to cars of steel construction be by rivets or U bolts.

3. That malleable iron be used in the manufacture of permanent stake pockets.

4. That stakes should be located to suit the construction of the car or the requirements of the service, but should not be placed farther apart than 4 feet from center to center.

TEMPORARY STAKE POCKETS.

In 1905, as a result of the letter ballot, the following dimensions were adopted as Recommended Practice for Temporary Stake Pockets:

For flat cars and gondola cars with sides less than 30 inches high, 4 inches wide by 5 inches deep.

For gondola cars with sides 30 inches and over, 4 inches wide by 4 inches deep.

LONGITUDINAL SPACING OF TEMPORARY STAKE POCKETS.

Sheet M. C. B. — A.

In 1906 a plan for longitudinal spacing of temporary stake pockets for gondola cars was adopted as Recommended Practice.

FRAMING FOR BOX CARS.

Sheet M. C. B. — K.

In 1904, the style of framing shown on Sheet M. C. B. — K for cars of 60,000 pounds capacity was adopted as Recommended Practice.

In 1904, the style of framing shown on Sheet M. C. B. — K, for cars of 80,000 pounds and 100,000 pounds capacity, was adopted as Recommended Practice.

In 1904, the style of end framing shown on Sheet M. C. B. — K, for cars of 60,000 pounds, 80,000 pounds and 100,000 pounds capacity, was adopted as Recommended Practice.

In 1904, the use of a plank lining 1¾ inches thick, on the inside of the ends of cars, extending from the floor to the underside of the car line, was adopted as a Recommended Practice. See letter ballot, Proceedings 1904.

INSIDE DIMENSIONS OF BOX CARS.

In 1904, the inside dimensions of box cars approved by the American Railway Association, namely, 36 feet long, 8 feet 6 inches wide and 8 feet high, were adopted as a Recommended Practice.

HEIGHT AND WIDTH OF CARS.

In 1904 the following dimensions for box cars built on low trucks (3 feet 6 inches to top of floor) were adopted as Recommended Practice:

Height from top of rail to upper edge of eaves, 12 feet ¾ inch; width at eaves at above height, maximum, 9 feet 7 inches.

MARKING ON FREIGHT EQUIPMENT CARS.

Sheet M. C. B.—A.

1. Freight Equipment Cars that have a superstructure which will permit should be stenciled with markings on sides of car, in the following order:

Lettering (Initials or name of Road),
Number,
Capacity,
Light Weight.

This marking is to be located as nearly over the truck as the lettering will permit, preferably to the left of center line of side of car. On box and other house cars where doors slide to the left, the above marking may be placed to the right of center line of side of car. On any other cars where the construction makes it necessary, this marking may be placed either to the right of center line of side of car, or in the center of side of car. The distance from the center line of coupler to the bottom of car number to be normally 2 feet 4½ inches, with a minimum dimension of 1 foot 10½ inches, and a maximum of 2 feet 10½ inches. The spacing of the remaining marking to be as shown on diagram.

2. The ends to show the initials or name of road, car number and light weight, in the upper half of end of car. On box or other house cars having end doors this lettering should be so located that it will not be obscured when doors are open.

3. Flat and low-sided gondola cars should show the lettering (initials or name of road), number, capacity and light weight on the side of car in the best available location offered by the construction of the car. Suggestions as to the arrangement of this lettering are shown on the diagrams. When possible the sizes of lettering and figures should correspond with present Recommended Practice. The end marking on flat cars may be omitted.

4. Side and end doors should be stenciled with the initials or name of road either on the outside or inside of door. If placed on the inside the stenciling should be so located that it will not be defaced by the sliding of the door.

STENCILING CARS.

Sheet M. C. B.—M.

As a result of a special letter ballot in March, 1906, certain sized letters and numerals were adopted as Recommended Practice for the uniform stenciling of cars, as follows:

1. That Roman letters and figures of the design shown on Sheet M. C. B.—M be used.

2. That the sizes of these letters and figures be confined to 1, 2, 3, 4, 7 and 9 inches.

3. That 7 and 9 inch letters or figures be used for the initials, names and numbers for the sides of cars, and 4-inch letters or figures for the lettering on the doors and ends of cars.

4. That for other car-body markings on sides and ends, such as capacity, couplers, brake beams, class of car, date built, outside and inside dimensions, and markings inside of car, 2 or 3 inch letters and figures be used, with the following exceptions:

(a) All weight marks to be 3 or 4 inch letters or figures.

(b) Trust marks, patent marks and other private marks should be 1-inch letters or figures.

5. That all marks on trucks be confined to 1 or 2 inch letters or figures.

6. That stenciling on air-brake cylinders or reservoirs be 1-inch letters or figures.

BOX CAR SIDE DOOR AND END DOOR FIXTURES.

Sheet M. C. B. — F.

In 1897 a committee on this subject reported with details which were afterward adopted by letter ballot as Recommended Practice of the Association. See Sheet M. C. B. — F. Proceedings 1897, page 186.

PEDESTAL AND JOURNAL BOX FOR PASSENGER CARS, FOR JOURNALS 5 BY 9 INCHES.

Sheet M. C. B. — C & E.

The pedestal and journal box shown on these drawings were adopted as Recommended Practice in 1903. The journal box was revised in 1908.

SPRINGS AND SPRING CAPS FOR FREIGHT CAR TRUCKS.

Sheet M. C. B. — H.

In 1898 detail designs of spring coils and caps suitable therefor were adopted as Recommended Practice, and were then shown on Sheet M. C. B. — J.

In 1901 a committee presented revised drawings with full details and specifications. They were submitted to letter ballot and adopted as Recommended Practice, and are now shown on Sheet M. C. B. — H.

In 1901 designs with full details and specifications for springs for 100,000-pound capacity cars were presented, and as a result of letter ballot were adopted as Recommended Practice. See Sheet M. C. B. — H.

COLLECTION OF SALT-WATER DRIPPINGS.

Sheet M. C. B. — A.

In 1898 the subject of rust on trucks and track from salt-water drippings from refrigerator cars was discussed, and a Recommended Practice for the collection of such drippings was adopted. See Sheet M. C. B. — A.

SPLICING OF CENTER SILLS.

Sheet M. C. B.— G.

At the convention of 1905, the following methods for splicing of center sills on steel cars and cars constructed with steel underframes were adopted as Recommended Practice. Drawings illustrative of these methods of splicing are shown on Sheet M. C. B.— G.

The space for center sills, except as otherwise herein stated, to be located not less than 8 inches from either side of the body bolster, consisting of butt joints. The butt joints to be reinforced by plates on both sides to be not less than twice the length of the protruding end, but not exceeding 24 inches, and not less than same thickness of web plate, with the one on the flange side of channel to include flanges, while the outside plate should only cover the web. The rivets to be spaced as shown on Figs. "A" and " B " Sheet M. C. B.— G.

Fig. "A" shows the method of splicing center sills in front of body bolster, and Fig " B " shows method of splicing center sills back of body bolster.

Fig. " C " shows method of splicing in cases where cars are damaged to such extent that the center sills have to be cut off less than 8 inches from the front side of the body bolster; this method is not recommended for sills with protruding end less than 3 inches. The outside plate in this splice may be made of pressed steel or a casting. The rivets to be spaced as shown on sketch.

Fig. " D " shows the method of splicing side sills; this splice may be located on either side of the body bolster. The rivets to be spaced as shown on sketch.

DROP TEST MACHINE.

Sheet M. C. B. — I.

In 1900 the drop testing machine was modified, and a further modification made in 1901. For details see illustrations in report of committee, pages 147-154, Proceedings 1901. Further modification made in 1903. See report of Coupler Committee, Proceedings 1903. Further modified in 1904. See letter ballot.

KNUCKLE PIVOT PIN TESTING MACHINE.

Sheet M. C. B. — I.

In 1907 a design of apparatus for testing knuckle pivot pins was adopted as Recommended Practice, and is shown on Sheet M. C. B. — I.

RULES FOR EXAMINATION OF CAR INSPECTORS.

In 1902 the following rules for examination of car inspectors were adopted as a Recommended Practice of the Association:

REQUIREMENTS.

One year at oiling cars.

Two years at car repairing.

Age limit for new men, thirty years.

Age limit for promoted men, forty years.

Vision, 20-20 in one eye and not less than 20-40 in the other, without glasses.

METHOD OF TESTING.—*Acuity of Vision.*— The test card should be hung in a good light and the party to be examined should, if possible, be seated with his back to the window. Each eye should be examined separately, using, for the purpose of excluding one eye, a folded handkerchief. The lowest line that can be read should be determined by exposing only one letter at a time through a hole cut in a strip of cardboard. In making out the report in each case, the visual acuity of each eye should be denoted by a fraction of which the numerator represents the number of feet at which the applicant is seated from the card, while the denominator represents the number of feet at which the lowest line which he can read should be read. Thus, if at 20 feet he reads the line marked 20 feet, his vision — 20-20 or 1, which is the normal standard. If at the same distance he only can read the line marked 70 feet, his vision — 20-70. If at 20 feet he reads the 15-foot line, the vision — 20-15, or more than normal. If a room 20 feet long can not be used, a testing distance of 15 or 10 feet should be employed, in which case normal vision would be represented by 15-15 or 10-10 respectively, and lower grades of vision by such fractions as 15-20, 10-70 and so on.

Field of Vision.— Test should be made by having the applicant and examiner stand about three feet apart, each with one eye shut, looking each other steadily in the eye. The examiner should then bring his hand in from the edge of the field toward the center of the space between them, until the applicant sees it coming. This should be done from different directions, up, down and from each side. The applicant should see the hand coming about as soon as the examiner does. If not, this should be noted on the report.

Hearing.— Test should be made in a quiet room. First, the examiner should hold the watch opposite the ear to be examined not less than 48 inches distant, then gradually approach the ear until the applicant hears the tick, the stop being used to satisfy the examiner that the applicant is not deceiving. The distance at which the applicant hears the watch should be noted in inches. The normal ear should hear the tick of the watch at 48 inches. Then the hearing power will be denoted by a fraction whose numerator represents the number of inches at which the watch is heard.

Thus, if he hears the watch at 48 inches, his hearing — 48-48, or normal. If he hears it at only 10 inches distant, his hearing — 10-48, and so on.

Color.— The committee does not think it essential that inspectors should be rejected on account of imperfect color sense. It is, however, believed that inspectors should be tested as to their color sense so that they, as well as their employer, may know their condition in this respect.

Educational.— The applicant should be able to write a legible hand in English, and also to read manuscript matter as well as printed matter.

Car Knowledge.— The inspectors should be able to name each part of the cars in general use, in preference using M. C. B. dictionary terms.

M. C. B. Rules.— Inspectors must pass a satisfactory examination on M. C. B. Rules, answering seventy-five per cent of the questions submitted. These questions should be of about the following character:

1. What are the Master Car Builders' Rules?

2. What is the object of the M. C. B. Rules?

3. What is the underlying idea or principle of these rules?

4. When is a company, operating the cars of another company, responsible for defects of such cars?

5. When a company is thus responsible, what should it do?

6. What care should be given to foreign cars by the company hauling them?

7. What cars must be accepted in interchange?

8. What is a defect card and how is it used?

9. Under what conditions is a road obliged to accept a car which is carded for defects for which the owner is not responsible?

10. What are the defects of wheels and axles for which owners and delivering companies are responsible?

11. Describe the form and use of the M. C. B. wheel gauge?

12. What are the rules which apply to the cleaning of triple valves and cylinders?

13. What does the limit of height of drawbars mean?

14. When a company is obliged to make improper repairs, what must it do to call attention to such repairs?

15. What does the term unfair usage mean?

16. What are the rules regarding splicing sills?

17. What is the purpose of the repair card?

18. How do these rules apply to switching roads?

19. Are switching roads allowed to render bills against owners direct for repairs of any other than those named in Section 23 of Rule 5?

MISCELLANEOUS.

The following items, formerly among the Standards, are given on account of the recommendations of the Association and the information contained:

DICTIONARY OF TERMS.

At the Fifth Annual Convention, held in Richmond, Virginia, in 1872 *(see page 18 of the report of that meeting),* it was

"*Resolved,* That a committee be appointed with power to publish an illustrated book, defining the proper terms or names of each and every part used in the construction of railway cars, and a description of the use of the same."

At the Fourteenth Annual Convention, held in Detroit in 1880 *(see pages 11 to 20 of the report of that meeting),*

"The committee to which was assigned the duty of preparing a dictionary of terms used in the construction of cars submitted a copy of the book and reported that it had finished its work, and it was discharged."

ENTERTAINMENTS.

At the Ninth Annual Convention, held in New York in 1875, the following resolution was adopted *(see page 113 of the report of that meeting):*

"*Whereas,* The practice of entertaining the members of this Association by its friends has become an established custom, and has thus assumed somewhat the character of an obligation to which those who have so generously dispensed hospitality have in a measure felt themselves obliged to conform; and

"*Whereas,* The expenditure of time and money for this purpose has in many cases been very much greater than the members of this Association have a right to expect should be devoted to their enjoyment; and

"*Whereas,* The expense of such hospitality has in some cases been interpreted as having a significance which has been the cause of embarrassment to members;

"*Therefore,* We desire, by this resolution, first, to express our thanks for the liberality of our friends in the past; and, secondly, to make the request in this public way that in the future there shall be no more expenditure of money for the public entertainment of members of this Association.

The preamble and resolution were unanimously adopted.

Obituary.

MATTHIAS NACE FORNEY.

Matthias Nace Forney, the designer of the most successful suburban locomotive ever introduced, and a celebrated mechanical engineer and accomplished engineering writer, was born in Hanover, Pennsylvania, in 1835, of German stock, and died at New York on January 14, 1908.

His father died when Matthias was twelve years old, leaving the mother with three sons and three daughters. Hanover having, at that time, very indifferent school facilities Matthias was sent to school in Baltimore, which had something of a high-school character. He early displayed a strong tendency toward mechanism and science, one of his earliest ambitions having been to make a steam engine. With such tastes it was not surprising to find that he entered the shops of the great pioneer locomotive builder, Ross Winans, as an apprentice in 1852. He spent three years working in the shops and one year in the drawing office. At the end of his apprenticeship he obtained a position as draftsman in the shops of the Baltimore & Ohio Railroad, then in charge of Henry Tyson. He remained in that position three years.

Thinking that prospects of success in life were very meager on railroads, Mr. Forney left railroad work and entered mercantile business in Baltimore. But the attractions of machinery were upon him and three years of business found him ready to return to his first love. The resulting change was to enter the employ of the Illinois Central Railroad as draftman under Samuel J. Hayes, superintendent of machinery.

In the course of an autobiography presented to the New York Railroad Club in 1902 Mr. Forney said, concerning the Chicago period of his career:

" During my employment on the Illinois Central Railroad their shops were located in Chicago near where the present passenger station now stands. To show how slight events sometimes lead to more important ones, it will be explained that my boarding place was then in Wabash avenue, near Washington street, a locality now covered with sky-scrapers,

M. N. Forney

and my daily walk was on Michigan avenue to and from the shops. The tracks of the Illinois Central Road then extended on piling over the lake, from the shops to the station, which was then about a mile farther north. There were at that time on the road some four-wheeled switching engines which weighed about twenty tons and had four-wheeled tenders. These engines would pull as heavy a train as the heavier eight-wheeled

'American' engines with four coupled wheels and weighing thirty tons. In my daily walks in pursuit of Chicago nutriment, I saw these switching engines backing up to the shops on the track, which was in plain view. The question consequently occurred to me, 'If the little engines will pull as much as the big ones, why are the little ones not used in general road service?' As the road in this location was in plain view from Michigan avenue, and the engines and tenders showed distinctly in side elevation while running to and fro, it was apparent that, having a short wheel base, they were very unsteady. The idea then occurred to me, why not connect the engine and tender by a rigid frame and put a truck under the tender? This would give a long wheel base with steadiness, and retain the whole weight of the boiler and engines on the driving wheels for adhesions. This was the origin of what has since been known as the 'Forney' engine."

After some persistent efforts Mr. Forney and his friends succeeded in getting Forney locomotives placed upon the elevated railroads in New York and they operated so successfully in that service that they became the motive power for all the elevated and many surface suburban railroads. They held constant favor for that work until they were displaced by electric motors.

After serving the Illinois Central for three years Mr. Forney entered the service of the Detroit Iron & Bridge Works, as draftsman, but remained there only a short time, having been engaged by the president of the Illinois Central Railroad to superintend the building of some locomotives under construction at Hinkley & Williams' Works in Boston. This was in the spring of 1865 and occupied Mr. Forney about six months. On the completion of the engines Mr. Forney remained with Hinkley & Williams about three years as mechanical engineer and agent.

When the inspiration is given a person to express thought and ideas in writing the tendency to do so will not long remain suppressed. The journalistic faculty permeated Mr. Forney's mind, and for a time he obtained vent for his thoughts through various railroad and engineering publications, particularly the *Railroad Gazette.* This led him, in 1870, into negotiations with the *Gazette* for a position on the staff, and he was appointed associate editor, the paper being then published in Chicago. The great fire occurred there the following year and the headquarters of the *Railroad Gazette* were moved to New York, Mr. Forney having bought a half interest in the property. His work very quickly brought the *Railroad Gazette* to be recognized as the best authority in the world on railroad mechanical engineering. He began writing what is known as "The Catechism of the Locomotive" in 1873, and it was published in his paper in serial form and afterward in book form. It was rewritten ten years later, and the author was engaged rewriting it at the time of his death.

Besides his well-known locomotive, Mr. Forney was the inventor of many devices, mostly for railroad purposes. In the autobiography already referred to he says:

"Invention has always had a great fascination for me as it has many others. It is akin to the passion which the fatuity of gambling has to a gamester, and once having developed the taste for invention, its allurements have led me on, as will be shown by the following list of patents which have been granted me." Then follows a list of thirty-three patents, most of them for improvements on the locomotive.

Matthias N. Forney was a fertile inventor and an accomplished designer of railroad appliances, but his fame well rests upon his work as an engineering journalist and author. Besides possessing the faculty of clear, lucid diction that was always comprehensible, Mr. Forney's writings always possessed a streak of humor that enhanced their charm. When Angus Sinclair was writing his book on the "Development of the Locomotive Engine," he wrote asking Mr. Forney to send his portrait. In replying Mr. Forney wrote: "I have been waiting for several years past to get sufficiently good looking so as to have a better picture made. Since my long illness of last summer my friends tell me I am looking better, but, alas, none of them say I am better looking." When he sent a picture a few weeks later, he wrote: "The photographer struggled hard to make a handsome picture, but, as you will see, he did not succeed. The worst of it is that the picture looks like me."

As editor of the *Railroad Gazette* Mr. Forney never failed to tell the truth about the engineering heresies and humbugs that were coming to public notice periodically. The narrow-gauge fallacy, the Fontaine locomotive idiocy, and many other freaks had their day of popularity shortened by Mr. Forney's incisive analysis and scathing ridicule.

In 1883 Mr. Forney left the editorial chair of the *Railroad Gazette,* realizing that he was overworking himself. A few months before taking this step he asked Angus Sinclair to become his assistant, but that gentleman was working on another paper under a time engagement. Mr. Forney frequently said had he secured Mr. Sinclair as an assistant he would have remained with the *Gazette.*

Through his influence the Master Car Builders' Association was reorganized and Mr. Forney became secretary, holding the position for several years. Three years after quitting the editorial chair, the allurements of journalism overpowered his senses and he bought the *American Railroad Journal* and *Van Nostrand Engineering Magazine,* consolidating them under the name of the *American Engineering and Railroad Journal.* That enterprise did not prove successful, and he subsequently sold the property to Mr. R. M. Van Arsdale, who incorporated the paper with the *National Car and Locomotive Builder.*

Mr. Forney made some flights into the realms of politics, and published several books and pamphlets of a political character. But his great work is the "Catechism of the Locomotive." That has been an instruction book for several generations of railroad men and will hold a high educational position as long as steam locomotives remain in use.

Angus Sinclair.

HALL WILSON WATTS

Passed out of this life April 14, 1908, aged fifty-eight years.

For thirty-two years he was in the service of Jones & Laughlin Steel Company, of Pittsburg, and was Master Car Builder at the time of his death. He was a charter member of the Railway Club of Pittsburg and was elected president in November, 1907.

He was a man greatly beloved by his friends, business associates and employees, and held in highest esteem by his employers. He was active in Presbyterian church work, and lived the life of a consistent, Christian gentleman. His loss is inestimable to all who knew him.

L. H. Turner.

JAMES MACBETH.

Mr. James Macbeth was born in Aberdeen, Scotland, in 1846, coming to this country when nine years old. He served his apprenticeship with the Great Western Railroad at Hamilton, Ontario. After serving his apprenticeship he became connected with the New York Central at Syracuse as foreman in charge of repairing locomotives. In 1867 he was made an engineer on the Southern Central Railroad, remaining there until 1870, when he returned to the New York Central as locomotive engineer. In 1875 he became Master Mechanic of the I. G. & S. R. R., remaining there until 1878, when he became Superintendent of Construction and Machinery on the Elmira, Cortlandt & Northern Railroad, retaining that position until 1880. From 1880 to 1887 he was locomotive engineer for the Lake Shore & Michigan Southern Ry. In 1887 he was appointed Master Mechanic of the West Shore Railroad at East Buffalo, N. Y., holding this position until 1893. He was then appointed superintendent of the building of the Adirondack & St. Lawrence Railroad. Shortly after this he became Master Car Builder of the New York Central & Hudson River Railroad at East Buffalo, which position he held until his death, which occurred on July 5, 1907.

Mr. Macbeth was a member of the Master Car Builders' Association for a great many years, and was on the Executive Committee for some time. He was an untiring worker, and whatever duties were assigned him were carried out strictly to the letter. He was a man widely known and highly respected in the City of Buffalo. At the time of his death he was a member of the common council of Buffalo. He was considered one of the most loyal and sympathetic of men and of a very generous nature. He leaves a wife and two sons.

F. W. BRAZIER.

ORLANDO STEWART.

Mr. Orlando Stewart died in Boston, April 27, 1908, at the age of seventy-five years. Practically his entire life, from the age of fifteen to within one year of his death, was spent in railroad service, making nearly sixty years of continuous service. He was born at St. Albans, Maine, October 23, 1833, and at the age of fourteen began an apprentice in the shops of the Boston & Maine Railway, remaining with that road until 1850, at which time he accepted a position as gang foreman with the Erie Railroad Company.

In 1853 he accepted position of shop foreman with the Bellefontaine & Indiana Railway. This line is now a part of the Cleveland, Cincinnati, Chicago & St. Louis Railway.

In 1856 he commenced as engineer on the Boston & Lowell Railway (now a part of the Boston & Maine Railway), and remained with it until 1863, at which time he was appointed general foreman of the United States Government shops at Chattanooga, Tennessee, remaining in that capacity two years. He again resumed work as an engineer on the Boston & Lowell in 1866, remaining with it until 1878, at which time he was appointed foreman of the erecting shops of the Hinkley Locomotive Works at Boston. He remained with that company three years, and in 1881 accepted a like position with the Rhode Island Locomotive Works at Providence, Rhode Island. He held this position for one year only, when he concluded to again engage in active railroad work, and was appointed Assistant Master Mechanic of the New York, Providence & Boston Railway (now a part of the New York, New Haven & Hartford Railway). This position he resigned in 1884 to accept the important position of Superintendent of Motive Power of the Fitchburg Railroad (now a part of the Boston & Maine Railway).

He was with the above road for a long time, and in 1894 he accepted the position of Superintendent of Motive Power and Equipment of the Bangor & Aroostook Railway, with headquarters at Hartwell, Maine. He was located at Hartwell for ten years, and then transferred to Milo Junction, Maine, where the new shops of the Boston & Albany Railway are located. He held this position up to October 1, 1907, at which time he resigned on account of ill-health. Mr. Stewart had been in poor health for a year prior to resigning from the service. Upon his retirement from railroad service he moved to Boston, Massachusetts, but his health did not improve, and the end came April 27, 1908.

Mr. Stewart was a prominent Mason, and also an Odd Fellow. He was an earnest and loyal citizen, highly respected by the officials and the employees. He had been an active member of the Master Mechanics' Association since its organization, and was well and favorably known by all its members. He leaves a widow and one married daughter, who reside in Boston.

PHILIP M. HAMMETT.

DAVID W. HUNTER.

David W. Hunter was born in Glasgow, Scotland, January 28, 1845, coming to Detroit, Michigan, when four years old. He received his education in the public schools of Detroit, and later, in the early years of his railroad life, took a course in mechanical drawing.

As a young man he went to work for the Pullman Car Company at Detroit, and while in their employ, about the year 1869, went to Montreal, where he remained two years. In 1871 he went to Rutland, Vermont, in the service of the Central Vermont Railroad. In 1872 or 1873 he entered the employ of the Providence & Worcester Railroad (afterward the New York, Providence & Boston Railroad), at Providence, Rhode Island, having charge of the car department until 1890, being then employed by the New York & New England Railroad as general foreman of the car department, at Norwood, Massachusetts, until 1894. For a short time in 1895 he had charge of the New York & New England car shops at Norwich, Connecticut, remaining there until the shops were closed. He then became general storekeeper for the New York & New England Railroad, at Norwood, Massachusetts, until the consolidation of that road with the New York, New Haven & Hartford Railroad in 1898, being then appointed inspector of buildings of the New York, New Haven & Hartford, which position he held at the time of his death.

Mr. Hunter attended the Universalist Church, was a Mason and Knight Templar, a member of the Master Car Builders' Association since 1884, and a member of the New England Railroad Club.

He died at West Haven, Connecticut, December 26, 1907, of pneumonia, being buried at Pawtucket, Rhode Island, with full Knights Templar honors. He is survived by his wife and two daughters.

He was always regarded as a most capable and efficient man in the various positions he occupied, being scrupulously honest in all his dealings with his fellow men, faithful to his employers, and taking an interest in the welfare of those of whom he had charge, who all looked to him as a friend.

Although during the latter years of his life he was not actively engaged in work connected with carbuilding, he always maintained his interest in such matters and in the affairs of the Master Car Builders' Association. He also took great interest in scientific studies and was usually well informed in astronomical, electrical and similar branches.

G. W. WILDIN.

ROBERT McKENNA

Was born in Girvan, Ayrshire, Scotland, August 2, 1825, and died in Scranton, Pennsylvania, January 10, 1908. At the age of fourteen he was apprenticed to a patternmaker and joiner in his native town, with whom

he remained until he reached the age of twenty-three, when, realizing the limitations of the old country, he decided to cast his fortunes with the new.

Mr. McKenna landed in New York in 1848, from which time until 1853 he worked as a journeyman patternmaker. In the last-mentioned year he entered the service of the Hudson River Railroad (now the New York Central & Hudson River Railroad) as a patternmaker, being rapidly advanced to foreman and general foreman, as the latter having charge of the car shops at the New York terminal.

In 1870 he severed connections with the Hudson River Railroad and in the same year became Master Car Builder of the Delaware, Lackawanna & Western Railroad, with headquarters at Scranton, Pennsylvania, remaining with that company until 1899, when he retired on account of failing health, induced by advancing years.

Born of Scotch Presbyterian parents, he was, from early boyhood, actively identified with that faith, and being essentially a home-lover his social life was confined almost exclusively to home and church affairs.

He was actively interested in the Master Car Builders' Association, being a member almost from its inception, and had for years prior to his death been on the list of life members.

Mr. McKenna was of the rugged type of Scotch-born Americans whose honor was never questioned and whose friendship was eagerly sought after, and when gained, was zealously cherished. He is survived by two sons and three daughters, his wife having died in 1899.

T. S. Lloyd.

JOHN T. KEBLER.

John T. Kebler became a member of the Master Car Builders' Association in 1903, and died April 12, 1907. He was a man of liberal education and innate culture, well read, and essentially a gentleman by birth and instinct. He was a graduate of the University of Cincinnati, and took a mining engineer's course in Boston "Tech." He then came to Colorado, and worked under R. C. Hills, Geologist of the Colorado Fuel & Iron Company.

After a year of this apprenticeship, he went to Iowa. There he first became established with what is known as "the Iowa crowd," which originally built up the Colorado Fuel & Iron Company. He became Superintendent of the Whitebreast Fuel Company, controlled by John C. Osgood. In 1893 he came back to Colorado, and was Superintendent of the Rouse Mine, near Walsenburg. Five years later he was appointed Superintendent of the Western Division of the Colorado Fuel & Iron Company's mines. In 1901 he became General Manager of the Fuel Department of the Colorado Fuel & Iron Company, also General Manager of the Colorado & Wyoming Railway, which position he held until the date of his death.

He was a schoolmate of William H. Taft and the latter's brothers, and they kept up their friendship, although at a distance.

In his official capacity, Mr. Kebler was noted for his almost encyclopedic knowledge of his specialty, coal mining. It is certain that no engineer or expert in the State was more familiar with the geology of the Colorado coal fields. His sound judgment and executive ability was demonstrated in the solid, tangible results he produced for his company.

T. B. Purves, Jr.

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Standard Journal Box and Contained Parts.
For Journal 3¾ by 7 inches.

M. C. B.–1.

Standard Journal Box and Contained Parts.
For Journal 3¾ by 7 inches.

M. C. B.—2.

Standard Journal Box.
For Journal 3¾ by 7 inches.

M. C. B.—3.

Standard Bearing, Wedge and Lid.
For Journal 3¾ by 7 inches.

M. C. B.—4.

Standard Journal Box and Contained Parts.
For Journal 4¼ by 8 inches.

M. C. B.—5.

Standard Journal Box.
For Journal 4¼ by 8 inches.

M. C. B.—6.

Standard Bearing, Wedge and Lid.
For Journal 4¼ by 8 inches.

M. C.B.—7.

Standard Axles.
Standard Wheel Circumference Measure.
Standard Wheel Tread.

M. C. B.—8.

Standard Brake Head, Shoe and Key.

M. C. B.—9.

Standard for Air Brake Hose.
Standards for Air Brakes on Freight Cars.
Standard Location of Main Air Pipe on Freight Cars.

M. C. B.—10.

Standard Pedestal.
For Journals 3¾ by 7 inches.

M. C. B.—11.

Standard Automatic Coupler.
Contour Line.
Limit Gauges.

M. C. B.—12.

Standard Terms and Gauging Points for Wheels and Track.
Standard Guard Rail and Frog Wing Gauge.
Standard Reference Gauges for Mounting and Inspecting Wheels.
Standard Wheel Check Gauge.
Standard Wheel Defect and Worn Coupler Limit Gauge.
Standard Wheel Tread and Flange Thickness Gauges for New Wheels.
Standard Wheel Tread and Flange.

M. C. B.—13.

Standard Journal Box and Contained Parts.
For Journal 5 by 9 inches.

M. C. B.—14.

Standard Journal Box.
For Journal 5 by 9 inches.

M. C. B.—15.

Standard Bearing, Wedge and Lid.
For Journal 5 by 9 inches.

M. C. B.—16.

Journal Box and Contained Parts.
For Journal 5½ by 10 inches.

M. C. B.—17.

Journal Box.
For Journal 5½ by 10 inches.

M. C. B.—18.

Journal Bearing, Wedge and Lid.
For Journal 5½ by 10 inches.

M. C. B.—19.

Safety Appliances.

M. C. B.—19A.

Safety Appliances.

Box and Other House Cars With End Ladders

(Wood).

M. C. B.—19C.

Safety Appliances.

Box and Other House Cars With Side Ladders
(Wood).

M. C. B.—19D.

Safety Appliances.

Box and Other House Cars With Side Ladders

(Iron).

M. C. B.—19E.

Safety Appliances.

Drop End Gondola.

(End Handholds on Under Side of End Sills.)

M. C. B.—19F.

Safety Appliances.

Drop End Gondola.

(End Handholds on Face and End Sills.)

M. C. B.—19G.

Safety Appliances.

Fixed End Gondolas.

Low Car With Brake Step.

M. C. B.—19H.

Safety Appliances.

Fixed End Gondolas.

Low Car Without Brake Step.

M. C. B.—191.

Safety Appliances.

Fixed End Gondolas.

High Cars With Single Side Handholds.

M. C. B.—19J.

Safety Appliances.

Fixed End Gondolas.

High Cars With Side or End Ladders.

M. C. B.—19K.

Safety Appliances.

Tank Cars.

With Side Platforms and Safety Railings.

M. C. B.—19L.

Safety Appliances.
Tank Cars.
With No End Sills.

M. C. B.—19M.

Safety Appliances.

Tank Cars.

(With No Side Sills. High Running Boards.)

M. C. B.—19N.

Safety Appliances.

Flat Cars.

(End Handholds On Under Side of End Sills.)

M. C. B.—190.

Safety Appliances.

Flat Cars.

End Handholds On Face of End Sills.

M. C. B.—19P.

Safety Appliances.

Hopper Cars.

M, C. B.—20.

Standard Passenger Car Pedestal for Journal
4¼ by 8 inches.
Changed from Recommended Practice, 1901.

M. C. B.—21.

Standard Journal Box and Contained Parts
for Journal 4¼ by 8 inches, for
Passenger Cars.
Changed from Recommended Practice, 1901.

M. C. B.—22.

Standard Center Plate.
Standard Arch Bars and Column Bolt for
80,000 lbs. Capacity Cars.
Standards for Iron Brake Beam.
Standard Gauges for Brake Beam and Head.
Lever Pin Hole Gauge.

M. C. B.—23.

Journal Bearing and Wedge Gauges for Journals 3¾ by 7 inches, 4¼ by 8 inches, 5 by 9 inches and 5½ by 10 inches.

M. C. B.—24.

Standard Sheathing, Flooring, Roofing and Lining.
Standard Marking of Freight Cars.

M. C. B.—25.

Standards for Loading Long Materials on Open Cars.

For additional information, see Sheets 25A and 25B.

M. C. B.—25A.

Standards for Loading Long Materials on Open Cars.

For additional information, see Sheets 25 and 25B.

M. C. B.—25B.

Standards for:
Loading Materials in Closed Cars.
Loading Long Materials on Open Cars.
For additional information, see Sheets 25 and 25A.

M. C. B.—A.

Recommended Practice for:

Marking of Freight Cars.
Collection of Salt Water Drippings.
Minimum Thickness of Steel Tires.
Manner of Taking Borings for Analysis of Axles.
Permanent Safety Chains for Wooden Underframe Freight Cars.
Permanent Safety Chains for Steel Underframe Freight Cars.
Temporary Stake Pockets for Gondola Cars.

M. C. B.—B.

Recommended Practice for:
Automatic Coupler Attachments.
Uncoupling Attachments.
Temporary Chains for Double Loads.

M. C. B.—C.

Recommended Practice
for
Journal Box for Passenger Cars, Journal
5 by 9 inches.

M. C. B.—E.

Recommended Practice
for
Steam and Air Line Connections.
Passenger Car Pedestal for Journal 5 by 9 in.
Steam Hose Coupling.
Combination Lamp Holder and Flag Bracket.

M. C. B. —F.

Recommended Practice
for
Box Car Side and End Doors.

M. C. B.—G.

Recommended Practice
for
Location of Air Brake Parts on Wooden Cars.
Twist Gauge for M. C. B. Couplers.
Splicing of Sills.

M. C. B.—H.

Recommended Practice
for
Springs and Spring Caps for Freight Car Trucks.

M. C. B.—1.

Recommended Practice
for
Drop Test Machine for M. C. B. Couplers.
Drop Test Machine for Knuckle Pivot Pins.

M. C. B.—J.

Recommended Practice
for
High Speed Foundation Brake Gear for Passenger Service.
Schedule for 6-wheel Trucks.
Cast Iron Wheels.
Limit Gauge for Remounting Cast Iron Wheels.

M. C. B.—K.

Recommended Practice
for
High Speed Foundation Brake Gear for
Passenger Service.
Schedule for 4-wheel Trucks.
Framing of Box Cars.

M. C. B.—L.

Recommended Practice
for
High Speed Foundation Brake Gear for
Passenger Service.
Schedule for 4-wheel Trucks.

M. C. B.—L.

Recommended Practice
for
High Speed Foundation Brake Gear for
Passenger Service.
Schedule for 4-wheel Trucks.

M. C. B.—M.

Recommended Practice
for
Lettering for Freight Cars.

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